echnical Memorandum NWS WR-177

CLIMATE OF PHOENIX, ARIZONA

Robert J. Schmidli

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(Revised)

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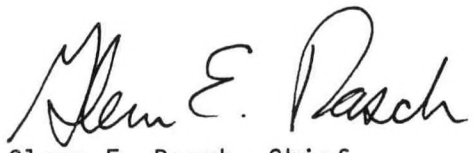

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PREFACE

The purpose of this publication is to provide comprehensive data on the climate of Phoenix. It is hoped that these data will help residents, visitors, prospective residents, agriculturalists, engineers, community planners, Chambers of Commerce, the movie industry, etc., make more skillful decisions affecting their lives, their plans for the future, and hence the whole economy of the area. Data in this revision is based on 90 full years of record, January 1, 1896 through December 31, 1985.

The assistance given by Mr. Robert S. Ingram, former Meteorologist in Charge, National Weather Service Office, Phoenix, Arizona, Mr. Paul C. Kangieser, former NOAA Climatologist for Arizona, and other staff members is gratefully acknowledged. The writer is gratefully indebted to Mr. Harold C. Bulk, Assistant State Climatologist, Laboratory of Climatology, Arizona State University, for his help in producing tables and graphs for the diurnal variation of temperatures, humidities, wet bulb and dew point temperatures, and also for the graphs of monthly temperatures and precipitation from 1896-1985. In addition, Mr. Bulk's article, "An Overview of Phoenix Climate" and Ms. Brazel and Mr. Balling's research paper, "The Myth of Increasing Moisture Levels in Phoenix", are included in this book.

CLIMATE OF PHOENIX

I. GENERAL GEOGRAPHICAL AND CLIMATOLOGICAL SUMMARY

Phoenix is located in about the center of the Salt River Valley, a broad, oval-shaped, nearly flat plain. The Salt River runs from east to west through the valley, but, owing to impounding dams upstream, it is usually dry. The climate is of a desert type with low annual rainfall and low relative humidity. Daytime temperatures are high throughout the summer months. The winters are mild. Nighttime temperatures frequently drop below freezing during the three coldest months, but the afternoons are usually sunny and warm.

At an elevation of about 1100 feet, the station is in a level or gently sloping valley running east and west. The Salt River Mountains, or south Mountains as they are commonly called, are located 6 miles to the south and rise to 2600 feet MSL. The Phoenix Mountains lie 8 miles to the north with Squaw Peak rising to 2600 feet MSL. The famous landmark of Camelback Mountain lies 6 miles to the north-northeast and rises to 2700 feet MSL. Eighteen miles to the southwest lie the Sierra Estrella Mountains with a maximum elevation of 4500 feet MSL, and 30 miles to the west-northwest are found the White Tank Mountains with a maximum elevation of 4100 feet MSL. The Superstition Mountains are approximately 35 miles to the east and rise to 5000 feet MSL.

The central floor of the Salt River Valley is irrigated by water from dams built on the Salt River system. To the north and west of the gravity flow irrigated district, there is considerable agricultural land irrigated by pump water.

There are two separate rainfall seasons. The first occurs during the winter months from November through March when the area is subjected to occasional storms from the Pacific Ocean. While this is classified as a rainfall season, there can be periods of a month or more in this or any other season when practically no precipitation occurs. Snowfall occurs very rarely in the Salt River Valley, while light snows occasionally fall in the higher mountains surrounding the valley. The second rainfall period occurs during July and August when Arizona is subjected to widespread thunderstorm activity whose moisture supply originates in the Gulf of Mexico, in the Pacific Ocean off the west coast of Mexico and in the Gulf of California.

The spring and fall months are generally dry, although precipitation in substantial amounts has fallen occasionally during every month of the year.

During the winter months the temperature is marginal for some types of crops. Areas with milder temperatures around the edges of the valley are utilized by these crops. However, the valley is subjected to occasional killing and hard freezes in which no area escapes damage.

The valley floor, in general, is rather free of strong wind. During the spring months southwest and west winds predominate and are associated with the passage of low-pressure troughs. During the thunderstorm season in July and August, there are often local, strong, gusty winds with considerable blowing dust. These winds generally come from a northeasterly to southeasterly direction. Throughout the year there are periods, often several days in length, in which winds remain under 10 miles per hour.

Sunshine in Phoenix area averages 85 percent of possible, ranging from a minimum monthly average of around 77 percent in January and December to a maximum of 94 percent in June. During the winter, skies are sometimes cloudy, but sunny skies predominate and the temperatures are mild. During the spring, skies are also predominately sunny with warm temperatures during the day and mild pleasant evenings. Beginning with June, daytime weather is hot. During July and August, there is an increase in humidity, and there is often considerable afternoon and evening cloudiness associated with cumulus clouds building up over the nearby mountains. Summer thundershowers seldom occur in the valley before evening.

The autumn season, beginning during the latter part of September, is characterized by sudden changes in temperature. The change from the heat of summer to the mild winter temperatures usually occurs during October. The normal temperature change from the beginning to the end of this month is the greatest of any of the twelve months in central Arizona. By November, the mild winter season is definitely established in the Salt River Valley region.

An Overview of Phoenix Climate

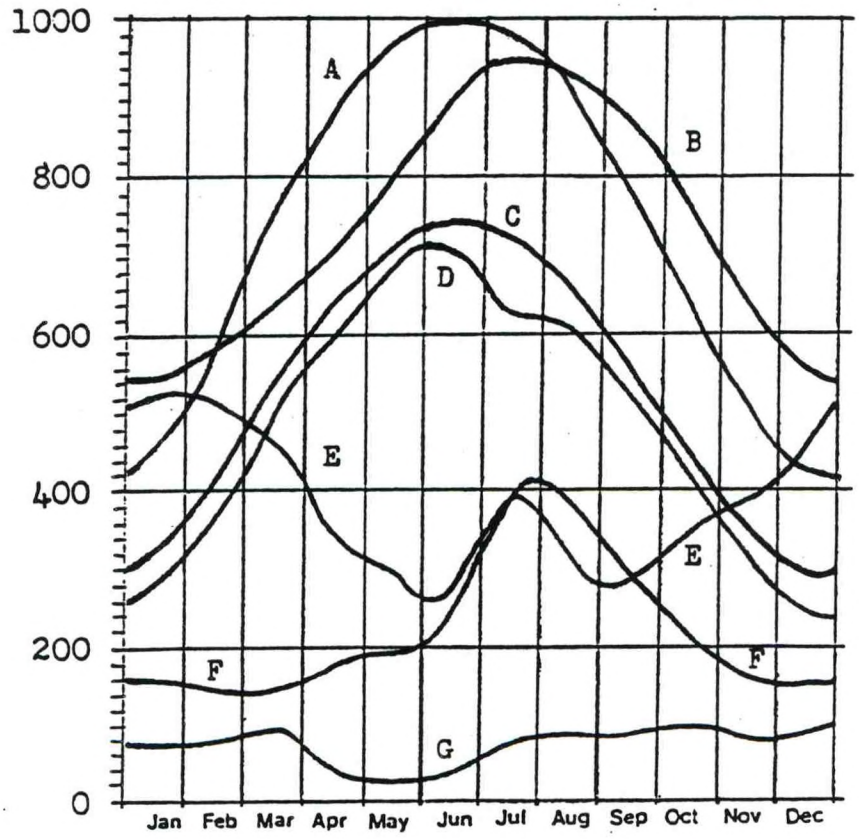
By Harold Bulk, Laboratory of Climatology, Arizona State University

The climate of a location is the synthesis of several elements. The temporal variations of several of these elements is shown in the graph on the following page.

The temperature of the air is probably the element that most people are aware of. Yet air temperature is the result of many other climatic elements. The most important is the receipt of solar energy, for solar energy is the force that drives most of the other climatic elements. The daily amounts of solar energy that are received at the top of the atmosphere (the extra-terrestrial radiation, or ETR) is shown in curve A. The amounts vary from nearly a thousand Langleys (1 Langley = 1 calorie per square centimeter) on the day of the Summer Solstice to about 400 Langleys on the day of the Winter Solstice. Clouds reflect a substantial portion of the solar energy. More is absorbed by water vapor in the air, and even the atmosphere itself will scatter a portion of the solar energy back to space as well as absorb a portion.

Curve C represents the amount of energy that can reach Phoenix on a clear, dry day. (Rosendahl, 1976). It is apparent that only about 70% of the ETR reaches the surface under these conditions. The ten-year average daily receipt of solar energy at Phoenix is shown in curve D.

DAILY ETR, MAXIMUM, AND AVERAGE RADIATION AND AVERAGE TEMPERATURE, PLUS AVERAGE CLOUDS, WATER VAPOR AND RAIN AT PHOENIX



Date Base is 1971-1980 for average daily values of radiation receipt, cloudiness, temperature, water vapor content and precipitation.
A is extraterrestial radiation (in langleys)
C is clear air radiation receipt (in langleys)
D is radiation receipt (in langleys)
E is cloudiness (in tenths x 100)
B is temperature (in degrees F x 10)
F is water vapor content (in millimeters x 100)
G is precipitation (in inches x 3000)

Some of the energy reaching the earth's surface is reflected back toward space by the earth itself, some is used to evaporate water, and the remainder warms the air. The large drop in energy receipt during July is directly traceable to the increase in cloudiness (curve E) during this period. (The depletion of solar energy due to clouds is also apparent during the winter months, although less spectacularly so). The continued depression of the averaged receipts of solar energy into August is due to the increased water vapor in the

atmosphere (curve F, from Reitan, 1960). The increased water vapor in the atmosphere is due to a shift in the winds from a predominantly westerly direction to a southerly direction, the so-called "Arizona Monsoon". Although the dry bulb temperatures may be depressed during this period, the "sensible temperatures" seem higher due to the increased humidity of the air.

Also shown is the ten-year average daily precipitation at Phoenix (curve G). It is seen that the largest average daily receipts occur in July and August. Rainfall plays a significant role in that a portion of the solar energy reaching the ground is used to evaporate moisture.

Curve B is the average daily temperature at Phoenix. This curve lags the curves for ETR (A), that of clear-day receipts (C), and that for averaged receipts (D). This is due primarily to the thermal lag of the earth. The flattening of the temperature curve during August is due to the energy absorbed by the enhanced rainfall during that time.

Clearly, the daily average temperature at Phoenix is the result of primarily the solar energy reaching the earth's surface and the precipitation regime.

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II. CLIMATOLOGICAL SUMMARY BY MONTHS

1. **January Weather**

The Phoenix area generally experiences its coldest weather in January, yet, daytime temperatures still average in the middle sixties. The normal daily maximum is 65.2, and the normal daily minimum 39.4 and the normal mean monthly temperature is 52.3.

The warmest January occurred in 1986 when the mean monthly temperature was 61.4; the coldest was in 1937 with a mean temperature of only 43.2. The highest temperature ever recorded in any January was 88 on the 19th in 1971. The lowest January temperature (and the all-time low for Phoenix) was 16 on January 7, 1913. The warmest night occurred on the 22nd in 1976 when the temperature fell no lower than 59. The record cold day for January and for any winter month was January 6, 1913, when the high, low, and mean temperatures were 39, 17, and 28, respectively.

The relative humidity for the month averages about the same as that for December. The low value in the afternoon averages around 32 percent.

The mean hourly surface wind speed is around 5.3 m.p.h., and the prevailing direction is from the east. The peak gust was 60 m.p.h. from the west on January 27, 1983.

Precipitation during the month normally totals 0.73 inches, but it has ranged from 3.67 in 1897 to none in 1912, 1924, and 1972. The greatest amount of precipitation in 24 hours was 1.76 inches which occurred on January 9-10, 1905. There are normally four days with 0.01 inches or more, but January 1916 had eleven such days.

Snow can occur in January, but it is unusual. Snow in amounts of up to 1 inch has been reported at the official observing station on six January days since 1896. The heaviest falls of just 1 inch fell in 1933 and 1937. On January 20-21, 1937, amounts up to 4 inches fell in parts of the city and some remained on the ground in shaded areas until the 23rd and 24th.

The mean monthly percentage of possible sunshine is 78 percent. The greatest amount ever recorded was 100 percent in 1924, and the least was 54 percent in 1935.

There are normally 14 clear days, 7 partly cloudy days and 10 cloudy days in the month. The greatest number of clear days was 27 in 1924 and 1925, while the greatest number of cloudy days was 22 in 1957.

2. February Weather

February begins the spring months where warm weather gradually returns to the Desert Southwest. High temperatures slowly rise from a normal of 67 at the beginning of the month to 72 at the end of the month, and nighttime temperatures moderate from 41 to 44. Nevertheless, a nighttime freeze is still a threat in February and into early March. Freezing temperatures can be expected on 3 or 4 nights during February.

Temperatures in the 90s can occur in February, but such occurrences are unusual. The highest ever was 92 on the 25th in 1921 and on the 27th in 1986, and dropped as low as 24 on the 7th in 1899 and on the 8th in 1933. The coldest February on record was in 1939 with a mean temperature of 48.6 and the warmest was 61.7 in 1977.

The normal rainfall for the month is 0.59 inches, and usually there are four days with 0.01 inches or more of rain. The month can be counted on to have at least one day with a thunderstorm, but in 1931 there were five days with thunderstorms. As much as 4.64 inches of rain have been measured in February back in 1905 and none fell in 1912, 1967, and 1984. There was 0.5 inches of snow on February 2, 1939, and a trace on three other days of the same month. A trace also fell on three consecutive days in February 1985.

There are usually 13 clear days, 6 partly cloudy days, and 9 cloudy days with an expectancy of 80 percent sunshine during the month.

3. **March Weather**

In March temperatures begin to warm noticeably. The average daily high temperature rises from 72 to 78 during the month and temperatures above 85 are not uncommon in the last days. At the same time, average daily low temperatures rise from 44 to 49. However, it should be remembered that even by the end of the month there is still a 20-percent chance of a 32 degree temperature in the coldest sections of the valley.

The normal mean temperature for the month is 60.6. The warmest March on record occurred in 1972 when the average temperature was 70.6, and the coldest occurred in 1897 with 54.3 degrees. The highest temperature ever recorded on a March day was 98 on the 27th in 1986. The lowest temperature was 25 on the 4th in 1966. Some March days can still be cold, and a high temperature of only 49 was observed on the 2nd in 1915. At the other extreme, the temperature did not fall below 74 on the 28th in 1986. This is warm even for early summer.

Rainfall,during March, averages 0.81 inches. As much as 4.82 inches was measured in 1941, and none was recorded in 1933, 1956, 1959, and 1984. Four days with measurable rain can be expected during the month, but in 1905 there were twelve such days.

Snow has been observed only twice since 1896. Two-tenths of an inch fell on the 12th in 1917, and a trace fell on the 3rd in 1976.

The month averages 9 cloudy days but has had as many as 15 in 1966. There was only 1 cloudy day in 1917. Although not especially a sunny month, March still averages about 83 percent of possible sunshine. In 1959 and 1984, there was 98 percent sunshine, and in 1905 there was a little as 61 percent.

4. **April Weather**

Elsewhere in the nation, April is greeted generally as the first month of spring:

"April and May are the keys of the year".

"April showers bring May flowers", etc.

But in Phoenix, spring has been under way for some time before April makes its appearance. The average high temperature rises from 79 at the beginning of the month to 87 by the end. One-hundred degree temperatures are unusual. In 1925 a 103 degree temperature was recorded on the 14th. The average number of days with temperatures of 100 or higher is less than one. Many years have none at all, but there were three days with 100 or higher in 1962. Nighttime temperatures rise from an average of 50 on the 1st to 57 on the 30th.

The mean temperature for the month is 68.0, and it has been as warm as 76.0 in 1981 and as cold as 62.4 in 1967.

April's rainfall continues the downward trend toward the May minimum, and the normal is only 0.27 inches. In 1926, 3.36 inches fell, and the last April without any rain was in 1962. Over the years, however, the month averages two days with measurable rain. The most measurable rain days occurred in 1926 with 13.

Winds become a bit more gusty in April with the increase in heating, and gusts on the order of 20 to 24 m.p.h. or higher can be expected on nine days and even gusts of 40 to 44 m.p.h. on one day.

April's sunshine averages 88 percent of possible, reaching a high value of 98 percent in 1954 and 1961, and a low of 68 percent in 1926.

Six cloudy days can be expected, but there were as many as twelve in 1959. The last April with no cloudy days occurred in 1920.

5. **May Weather**

James Russell Lowell said in Under the Willows, "May is a pious fraud of the almanac". In Phoenix this is only too true! In most sections of the Nation, May brings true spring weather; but

in the Desert Southwest, it signals the beginning of the long hot summer.

The average date of the first 100-degree temperature is May 16th. Such a temperature reading has been observed only once as late as June 18th in 1913, and 100-degree temperatures are not spring-like!

The average high temperature is 92.4, and the average low temperature is 61.5. The temperature has reached as high as 114 on the 30th in 1910 and has dipped as low as 39 on the 3rd in 1899. Fortunately, these are rare exceptions.

May signals the beginning of the dry season. The month averages only 0.14 inches of rain and is the driest month of the year. The most rain ever recorded in May was 1.31 inches in 1930. The month averages only one day with 0.01 inches or more of rain, and it has had as many as four such days, but no more. This happened in 1976. In contrast, there were 14 rainy days in February 1905. Thunderstorms occur on the average of once a month, but few can be seen in the distance on about three other days in the month.

Cloudy days are unusual and occur on only about four days. Sunshine on the average reaches the 93 percent level. Never has any May had less than 82 percent of possible sunshine, which was in 1953.

At the same time, May humidities, like June, are generally extremely low in comparison with those of July and August. Perhaps May should be appreciated more than it is because it is nature's way of conditioning residents for the steamy summer season of higher temperatures and humidities.

6. June Weather

June is the 2nd driest and one of the three hottest months of the year. The normal rainfall amounts to only 0.17 inches, but as much as 1.70 inches was measured in 1972. There is usually only one day when 0.01 inches or more of rain falls, and the greatest number of such days was only four. This happened only twice, in 1899 and 1932.

The normal mean temperature for the month is 86.5 and has ranged from 93.4 in 1981 down to 79.0 in 1965. In early June, the normal daily high temperature reaches 100 or higher and stays there until the middle of September. Average nighttime temperatures rise from 66 on the 1st to 76 on the 30th. However, on the 29th in 1976 the temperature did not fall any lower than 92. The month averages three days of 110 degrees or higher, but in 1974 there were eighteen such days.

Despite the increasing heat, the air is very dry with the relative humidity even slightly lower than that of May and the lowest of the year. Afternoon readings on the average dip as low as 11 percent. Sunshine is at its maximum and averages 94 percent. June 1916, 1917, 1928, and 1939 all had 100 percent sunshine. The lowest ever recorded was 78 percent in 1931. There are usually only two cloudy days, and the most that has ever been observed was six in 1956.

Toward the end of June, more thunderstorms become visible in the distance along the mountains heralding the arrival of the annual Arizona monsoon, that hot and humid period of midsummer.

7. **July Weather**

July is the month in which the Arizona monsoon usually arrives from the subtropical latitudes. This monsoon features an inflow of a deep blanket of moisture along with the usual summer high temperatures. A useful definition of a "monsoon day" for the Phoenix area is any day during which the average of the hourly dew point temperatures equals or exceeds 55 degrees F. Over the period of record, the average date of the first day of this event is July 8th.

The monsoon season generally begins in early July and extends through the middle of September; however, it began as early as June 16th in 1925 and as late as July 24th in 1943. The monsoon is not necessarily a permanent feature but may come and go, giving residents brief respites from the muggy weather. On the average there are about twenty monsoon days in July, but there were as many as thirty-one days in 1984 and as few as eight days in 1943.

Increased thunderstorm activity accompanies the arrival of the monsoon. Thunderstorms are visible on the average during twenty-five days of the month. On six or seven of these days, the storms are close enough for thunder to be heard at Sky Harbor International Airport. Dust storms associated with these thunderstorms are rather common.

With the increase in thunderstorm activity comes an increase in rainfall. The average for the month is 0.74 inches, but 6.47 inches fell in 1911. The month averages four days with 0.01 inches or more of rain but has had as many as thirteen days in 1896. The probability of a trace or more of rain on any particular day rises from 21 percent on the first of the month to a peak of 56 percent during the last ten days as the monsoon influence intensifies. July is the windiest month of the year with an average velocity of 7.2 m.p.h.

July's average temperature of 92.3 degrees is the highest of the year, and the month features an average high temperature of 105.0 and an average low of 79.5. The temperature has reached as high as 118 on the 11th in 1958 and on the 16th in 1925. The lowest ever recorded was 63 on the 4th and 5th in 1912. There are usually twenty-six days with 100 or higher and four days with 110 or higher during the month. In 1936 there were 13 days with 110 or higher. Nighttime temperatures generally fall to around 80, however, it did not fall below 92 on the 6th in 1983.

8. August Weather

By August the summer heat begins to moderate slightly, but humidities are higher than in July. This makes many residents feel that it is much hotter than it really is. Actually, the average high temperature is 102.3 or 2.7 degrees lower than in July.

August still averages 23 days with temperatures of 100 or higher and 1 day of 110 or higher. It has had as many as 31 days of 100 or higher in 1973 and 1975 and in several earlier years. There were as few as 9 such days in 1955. In 1962 and in 1975 there were 7 consecutive days of 110 or higher.

Rainfall in August averages 1.02 inches, the highest of any month of the year. The most rain ever recorded in August was 5.33 in 1951 and the least was a trace in 1973 and 1975. July is the only other month that always has had some rain.

Thunderstorms and "dusters" are most frequent in August with an average of 7 or 8 thunderstorm days, and thunderstorms clouds are usually visible on 24 days of the month.

Sunshine averages 85 percent during the month, but there are usually 4 cloudy days. In 1957 there were 10 cloudy days, and in 1953 and several other years there were none.

9. September Weather

September usually signals the end of the monsoon season. Although the long sustained periods of high humidity that occur principally in July and August may have ended, periods of high humidity do still occur in September. Twelve days in the month can usually be classified as monsoon days.

The average monthly temperature is 84.6 or 7.7 degrees lower than that of July. On the 1st of the month the average high is 101 and the low 75; by the 30th the average high is down to 94 and the low 66. Readings of 110 or higher are uncommon, but there were four such days in 1945, and a reading of 116 was observed on the 1st in 1950. The hot weather is not

completely over as there usually are on the average thirteen days with 100 or higher during the month. The average date of the last 100 degree temperature is the 27th. The lowest temperature ever recorded was 47 on the 20th and 21st in 1965 and on the 22nd in 1895.

Rainfall averages 0.64 inches. The most ever recorded was 5.41 inches in 1939, and the least was none in 1953, 1957, 1968, and 1973. The month averages three days with 0.01 inches or more, but in 1939 there were nine such days.

There are usually four days with thunderstorms and nine other days when thunderstorms are visible over the surrounding mountains.

The rainfall patterns change in September from the evening thundershower pattern of the monsoon season to a more generally distributed pattern more typical of the winter months.

There are usually three cloudy days, which next to June's two days, make it one of the least cloudy months of the year. Sunshine averages 89 percent of possible.

10. **October Weather**

During the month of October, weather is generated more from storm activity over the Pacific Ocean than from the subtropical moisture. High pressure systems that bring Indian Summer to the eastern sections of the Nation pass across the Great Basin area to the north, and dry, cold fronts often pass southward across Arizona, drying out and cooling the air.

The average temperature for the month is 73.4 or 18.9 degrees cooler than July. Daytime high temperatures usually begin the month at 94 but cool off to 81 by Halloween. Nighttime low temperatures drop from 66 to 53. These are the largest changes in normal high and low temperatures that occur during any month of the year. Record temperature extremes for the month range from 107 in 1980 to 34 in 1971. October does average one day each year with at least 100 or higher. The latest in the season that a temperature of 100 or higher has ever occurred was October 20, 1921.

Rainfall amounts to only 0.63 inches on the average. Rain falls more evenly during the 24 hours in contrast to the summer months when it is concentrated during the night.

The most rain that ever fell since records began was 4.40 inches in 1972. There is usually one thunderstorm day during the month.

The month averages four cloudy days. It averages 88 percent of possible sunshine and has never had less than 65 percent.

On the whole, October is a magnificent month with enough of the summer warmth to make outdoor living the most enjoyable of the year and yet with enough coolness to make it invigorating.

11. **November Weather**

With November usually comes the first 32 degree temperatures or below in the valley. Although the average date of such occurrence is December 12th at Sky Harbor International Airport, it usually occurs by:

November	21	in Buckeye
	22	in Tempe
	23	in Litchfield Park
	24	in Mesa
	25	in Deer Valley

The average temperature for the month is 60.6. Daytime high temperatures at the beginning of the month usually are about 80 and nighttime lows are normally 52. By the end of the month these temperatures have dropped to 69 and 43, respectively. The highest reading was a 96 on the 1st and 2nd in 1924, and the lowest was 27 on the 23rd in 1931.

By November the area is definitely under the influence of weather systems of more northern latitudes, and rainfall averages 0.54 inches. The most rainfall ever recorded was 3.61 inches in 1905, and the last time that no rain fell during the month was in 1980.

Snow has been observed only once since 1896. One-tenth of an inch was measured on the 28th in 1919.

Sunshine averages 83 percent of possible. However, there has been as much as 98 percent reported in 1948 and 1956 and as little as 62 percent in 1965 and 1982. On the average there are 18 clear days, 6 partly cloudy days, and 6 cloudy days.

The average wind velocity for the month is 5.4 m.p.h., and the strongest peak gust ever recorded was 60 m.p.h. on the 30th in 1982.

Unlike other sections of the Nation, this month is not the melancholy time that precedes the depressing winter months, but rather it is an invigorating month of sparkling days and cool nights.

12. **December Weather**

By December freezing temperatures in the valley are rather common, and freezing temperatures can be expected somewhere in the area on fifteen to twenty days of the month.

High daytime temperatures on the first of the month are about 69 and taper off slowly to 65 by the end of the month. Nighttime temperatures drop from 42 to 39. The highest temperature ever recorded was 87 on the 10th in 1950, and the lowest was 22 on the 31st in 1900 and on the 26th in 1911.

Total rainfall for the month averages 0.83 inches with the average of four days with 0.01 inches or more. Pacific storm systems move a little farther southward, bringing more moisture to replenish the water supply with snows in the mountains. The most rain recorded was 3.98 inches in 1967, and the least was none in 1900, 1901, 1917, 1958, 1973, and 1981.

A trace of snow has been reported on eight December days since 1896.

Sunshine now averages 77 percent with ten cloudy days. There was 98 percent of possible observed in 1958 and as little as 47 percent in 1914.

III. HISTORY OF WEATHER OBSERVATIONS

In the 1800s when communications in the United States were improved by the development of the railroads and telegraph, the practice of predicting weather from purely local signs and the haphazard measuring of meteorological phenomena began to decline. Scientists had noted correlations between the weather in one section of the country on a particular day and that in another section on the succeeding day. It was soon realized that a simultaneous knowledge of weather conditions all over the country could conceivably enable man to predict storms of major consequences, and that warnings from such predictions could save countless lives and protect property investments. But it was not until the late 1860s that mounting public interest in a national weather service culminated in the signing into law by President Grant on February 9, 1870, of a resolution providing for meteorological observations at all military stations within the United States.

The selection of the U.S. Army Signal Service to take such observations was dictated by the availability of communications facilities which the Signal Service had developed during the Civil War and were continuing to develop for protection against the Indians after the war. The original weather services provided by the military organization covered only the Gulf and Atlantic Coasts and the Great Lakes. Another Act of Congress, on June 10, 1872, extended these services throughout the entire United States.

Weather observations had been taken at many Army posts in Arizona prior to these formalities by Army Post Surgeons. Observations are available from some of these locations today:

Station	County	Data Began
Fort Defiance	Apache	December 1, 1851
Camp Crittenden	Santa Cruz	December 1856
Fort Mohave	Mohave	June 1859
Fort Grant	Graham	December 1, 1860
Camp Goodwin	Graham	August 1864
Fort Whipple (Prescott)	Yavapai	January 1865
Fort McDowell	Maricopa	September 1, 1866
Camp Wallen	Cochise	November 1866
Camp Date Creek	Yavapai	January 1867
Fort Bowie	Cochise	August 1, 1867
Camp Willow Grove	Mohave	November 1867
Camp Reno	Gila	February 1, 1868
Fort Verde (Camp Verde)	Yavapai	February 1, 1868
Camp Hualapai	Yavapai	December 1869
Fort Yuma	Yuma	January 1, 1870

Observations from these stations were primarily temperature and rainfall. It wasn't until 1891, when the U.S. Weather Bureau was established, that development of reporting stations proceeded with cautious economy.

The Bureau directed its attention mainly toward establishing a network of field stations. Faced with the growth of public interest, civic pride and the need to provide the best coverage for its forecasting and warning services with limited funds, the Weather Bureau could only slowly grant requests to establish weather stations in a rapidly expanding Nation.

The first Weather Bureau Office to open in Arizona was in Yuma where the duties were transferred from the Army at Fort Yuma in July 1891. Tucson followed in September of that year, and it was not until four years later that the small community of Phoenix rated a full station. Records had been kept in Phoenix by the Signal Service beginning on January 28, 1976, and Signal Service personnel continued to take observations until they transferred the station on the corner of Center and Washington Streets to the Weather Bureau on August 6, 1895.

In 1901 the office was moved to the southwest corner of 1st Avenue and Adams where it remained until it moved into the Federal Building on the southwest corner of 1st Avenue and Van Buren in March 1913. Three years later in June 1916, the office moved to the Water User's Building on the southeast corner of 2nd Avenue and Van Buren. It remained there until September 1924 when it moved to the Ellis Building at 2nd Avenue and Monroe. On October 21, 1936, it

moved to the Federal Building at Central and Fillmore where it stayed until it was closed on october 22, 1953.

Meanwhile, the development of air transportation and teletype communications in the 1920s and 1930s altered and redirected somewhat the purpose of the Weather Bureau as first defined by the law in 1890. This law provided for "the distribution of meteorological information in the interest of agriculture and commerce..." as one of the Weather Bureau's major functions. "Commerce" now included the mushrooming aviation industry -- and in 1940, to meet this partial change in emphasis, the Weather Bureau was transferred from the Department of Agriculture to the Department of Commerce where it remains today. In support of this new means of transportation, another Weather Bureau office was established at Sky Harbor Airport on May 2, 1933, and observations were taken there also until July 1935 when Department of Commerce radio operators took over the program. The Weather Bureau returned again to this station in January 1939 and has managed the station ever since that time.

In July 1965 the Weather Bureau was incorporated as an integral part of the Environmental Science Services Administration (ESSA). In October 1970 the names was changed to the National Weather Service, and it became integral part of the National Oceanic and Atmospheric Administration (NOAA).

ELEVATIONS

AT

NATIONAL WEATHER SERVICE FORECAST OFFICE

PHOENIX, ARIZONA

LATITUDE 33° 26' North

LONGITUDE 112° 01' West

ELEVATION OF AIRPORT		1128 Feet
ELEVATION OF IVORY TIP OF BAROMETER		1109.31
ELEVATION OF STATION PRESSURE		1107
ELEVATION OF GROUND AT HYGROTHERMOMETER		1110
ELEVATION OF GROUND AT WIND VANE AND ANEMOMETER		1110
ELEVATION OF CLIMATOLOGICAL STATION		1107
ELEVATION OF GROUND AT OFFICE		1106
ELEVATION OF HYGROTHERMOMETER	Above Ground	5 Feet
ELEVATION OF WIND VANE AND ANEMOMETER	Above Ground	33
ELEVATION OF SUNSHINE SWITCH	Above Ground	7
ELEVATION OF PYRANOMETER	Above Ground	6
ELEVATION OF RAIN GAGE	Above Ground	5

Acceleration of Gravity at Phoenix 979.428 cm/sec^2

Boiling Point of Water at Phoenix 210°F

TEMPERATURE CONVERSION

FAHRENHEIT TO CELSIUS

F	C	F	C	F	C	F	C	F	C
-20	-29	10	-12	40	4	70	21	100	38
-19	-28	11	-12	41	5	71	22	101	38
-18	-28	12	-11	42	6	72	22	102	39
-17	-27	13	-11	43	6	73	23	103	39
-16	-27	14	-10	44	7	74	23	104	40
-15	-26	15	-9	45	7	75	24	105	41
-14	-26	16	-9	46	8	76	24	106	41
-13	-25	17	-8	47	8	77	25	107	42
-12	-24	18	-8	48	9	78	26	108	42
-11	-24	19	-7	49	9	79	26	109	43
-10	-23	20	-7	50	10	80	27	110	43
-9	-23	21	-6	51	11	81	27	111	44
-8	-22	22	-6	52	11	82	28	112	44
-7	-22	23	-5	53	12	83	28	113	45
-6	-21	24	-4	54	12	84	29	114	46
-5	-21	25	-4	55	13	85	29	115	46
-4	-20	26	-3	56	13	86	30	116	47
-3	-19	27	-3	57	14	87	31	117	47
-2	-19	28	-2	58	14	88	31	118	48
-1	-18	29	-2	59	15	89	32	119	48
0	-18	30	-1	60	16	90	32	120	49
1	-17	31	-1	61	16	91	33	121	49
2	-17	32	0	62	17	92	33	122	50
3	-16	33	1	63	17	93	34	123	51
4	-16	34	1	64	18	94	34	124	51
5	-15	35	2	65	18	95	35	125	52
6	-14	36	2	66	19	96	36	126	52
7	-14	37	3	67	19	97	36	127	53
8	-13	38	3	68	20	98	37	128	53
9	-13	39	4	69	21	99	37	129	54

Conversion Equation

Celsius from Fahrenheit

$$C = \frac{5}{9}(F - 32)$$

Fahrenheit from Celsius

$$F = \frac{9}{5}C + 32$$

PRECIPITATION CONVERSION

INCHES TO MILLIMETERS

IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.
0.01	0.3	0.51	13.0	1.01	25.7	1.51	38.4	2.01	51.1	2.51	63.8
0.02	0.5	0.52	13.2	1.02	25.9	1.52	38.6	2.02	51.3	2.52	64.0
0.03	0.8	0.53	13.5	1.03	26.2	1.53	38.9	2.03	51.6	2.53	64.3
0.04	1.0	0.54	13.7	1.04	26.4	1.54	39.1	2.04	51.8	2.54	64.5
0.05	1.3	0.55	14.0	1.05	26.7	1.55	39.4	2.05	52.1	2.55	64.8
0.06	1.5	0.56	14.2	1.06	26.9	1.56	39.6	2.06	52.3	2.56	65.0
0.07	1.8	0.57	14.5	1.07	27.2	1.57	39.9	2.07	52.6	2.57	65.3
0.08	2.0	0.58	14.7	1.08	27.4	1.58	40.1	2.08	52.8	2.58	65.5
0.09	2.3	0.59	15.0	1.09	27.7	1.59	40.4	2.09	53.1	2.59	65.8
0.10	2.5	0.60	15.2	1.10	27.9	1.60	40.6	2.10	53.3	2.60	66.0
0.11	2.8	0.61	15.5	1.11	28.2	1.61	40.9	2.11	53.6	2.61	66.3
0.12	3.1	0.62	15.8	1.12	28.5	1.62	41.2	2.12	53.9	2.62	66.6
0.13	3.3	0.63	16.0	1.13	28.7	1.63	41.4	2.13	54.1	2.63	66.8
0.14	3.6	0.64	16.3	1.14	29.0	1.64	41.7	2.14	54.4	2.64	67.1
0.15	3.8	0.65	16.5	1.15	29.2	1.65	41.9	2.15	54.6	2.65	67.3
0.16	4.1	0.66	16.8	1.16	29.5	1.66	42.2	2.16	54.9	2.66	67.6
0.17	4.3	0.67	17.0	1.17	29.7	1.67	42.4	2.17	55.1	2.67	67.8
0.18	4.6	0.68	17.3	1.18	30.0	1.68	42.7	2.18	55.4	2.68	68.1
0.19	4.8	0.69	17.5	1.19	30.2	1.69	42.9	2.19	55.6	2.69	68.3
0.20	5.1	0.70	17.8	1.20	30.5	1.70	43.2	2.20	55.9	2.70	68.6
0.21	5.3	0.71	18.0	1.21	30.7	1.71	43.4	2.21	56.1	2.71	68.8
0.22	5.6	0.72	18.3	1.22	31.0	1.72	43.7	2.22	56.4	2.72	69.1
0.23	5.8	0.73	18.5	1.23	31.2	1.73	43.9	2.23	56.6	2.73	69.3
0.24	6.1	0.74	18.8	1.24	31.5	1.74	44.2	2.24	56.9	2.74	69.6
0.25	6.4	0.75	19.1	1.25	31.8	1.75	44.5	2.25	57.2	2.75	69.9
0.26	6.6	0.76	19.3	1.26	32.0	1.76	44.7	2.26	57.4	2.76	70.1
0.27	6.9	0.77	19.6	1.27	32.3	1.77	45.0	2.27	57.7	2.77	70.4
0.28	7.1	0.78	19.8	1.28	32.5	1.78	45.2	2.28	57.9	2.78	70.6
0.29	7.4	0.79	20.1	1.29	32.8	1.79	45.5	2.29	58.2	2.79	70.9
0.30	7.6	0.80	20.3	1.30	33.0	1.80	45.7	2.30	58.4	2.80	71.1
0.31	7.9	0.81	20.6	1.31	33.3	1.81	46.0	2.31	58.7	2.81	71.4
0.32	8.1	0.82	20.8	1.32	33.5	1.82	46.2	2.32	58.9	2.82	71.6
0.33	8.4	0.83	21.1	1.33	33.8	1.83	46.5	2.33	59.2	2.83	71.9
0.34	8.6	0.84	21.3	1.34	34.0	1.84	46.7	2.34	59.4	2.84	72.1
0.35	8.9	0.85	21.6	1.35	34.3	1.85	47.0	2.35	59.7	2.85	72.4
0.36	9.1	0.86	21.8	1.36	34.5	1.86	47.2	2.36	59.9	2.86	72.6
0.37	9.4	0.87	22.1	1.37	34.8	1.87	47.5	2.37	60.2	2.87	72.9
0.38	9.7	0.88	22.4	1.38	35.1	1.88	47.8	2.38	60.5	2.88	73.2
0.39	9.9	0.89	22.6	1.39	35.3	1.89	48.0	2.39	60.7	2.89	73.4
0.40	10.2	0.90	22.9	1.40	35.6	1.90	48.3	2.40	61.0	2.90	73.7
0.41	10.4	0.91	23.1	1.41	35.8	1.91	48.5	2.41	61.2	2.91	73.9
0.42	10.7	0.92	23.4	1.42	36.1	1.92	48.8	2.42	61.5	2.92	74.2
0.43	10.9	0.93	23.6	1.43	36.3	1.93	49.0	2.43	61.7	2.93	74.4
0.44	11.2	0.94	23.9	1.44	36.6	1.94	49.3	2.44	62.0	2.94	74.7
0.45	11.4	0.95	24.1	1.45	36.8	1.95	49.5	2.45	62.2	2.95	74.9
0.46	11.7	0.96	24.4	1.46	37.1	1.96	49.8	2.46	62.5	2.96	75.2
0.47	11.9	0.97	24.6	1.47	37.3	1.97	50.0	2.47	62.7	2.97	75.4
0.48	12.2	0.98	24.9	1.48	37.6	1.98	50.3	2.48	63.0	2.98	75.7
0.49	12.5	0.99	25.2	1.49	37.9	1.99	50.6	2.49	63.3	2.99	76.0
0.50	12.7	1.00	25.4	1.50	38.1	2.00	50.8	2.50	63.5	3.00	76.2

PRESSURE CONVERSION

INCHES TO MILLIBARS

IN.	MB.	IN.	MB.	IN.	MB.	IN.	MB.	IN.	MB.	IN.	MB.
28.00	948.2	28.50	965.1	29.00	982.1	29.50	999.0	30.00	1015.9	30.50	1032.8
28.01	948.5	28.51	965.5	29.01	982.4	29.51	999.3	30.01	1016.3	30.51	1033.2
28.02	948.9	28.52	965.8	29.02	982.7	29.52	999.7	30.02	1016.6	30.52	1033.5
28.03	949.2	28.53	966.1	29.03	983.1	29.53	1000.0	30.03	1016.9	30.53	1033.9
28.04	949.5	28.54	966.5	29.04	983.4	29.54	1000.3	30.04	1017.3	30.54	1034.2
28.05	949.9	28.55	966.8	29.05	983.7	29.55	1000.7	30.05	1017.6	30.55	1034.5
28.06	950.2	28.56	967.2	29.06	984.1	29.56	1001.0	30.06	1017.9	30.56	1034.9
28.07	950.6	28.57	967.5	29.07	984.4	29.57	1001.4	30.07	1018.3	30.57	1035.2
28.08	950.9	28.58	967.8	29.08	984.8	29.58	1001.7	30.08	1018.6	30.58	1035.6
28.09	951.2	28.59	968.2	29.09	985.1	29.59	1002.0	30.09	1019.0	30.59	1035.9
28.10	951.6	28.60	968.5	29.10	985.4	29.60	1002.4	30.10	1019.3	30.60	1036.2
28.11	951.9	28.61	968.8	29.11	985.8	29.61	1002.7	30.11	1019.6	30.61	1036.6
28.12	952.3	28.62	969.2	29.12	986.1	29.62	1003.0	30.12	1020.0	30.62	1036.9
28.13	952.6	28.63	969.5	29.13	986.5	29.63	1003.4	30.13	1020.3	30.63	1037.3
28.14	952.9	28.64	969.9	29.14	986.8	29.64	1003.7	30.14	1020.7	30.64	1037.6
28.15	953.3	28.65	970.2	29.15	987.1	29.65	1004.1	30.15	1021.0	30.65	1037.9
28.16	953.6	28.66	970.5	29.16	987.5	29.66	1004.4	30.16	1021.3	30.66	1038.3
28.17	953.9	28.67	970.9	29.17	987.8	29.67	1004.7	30.17	1021.7	30.67	1038.6
28.18	954.3	28.68	971.2	29.18	988.1	29.68	1005.1	30.18	1022.0	30.68	1038.9
28.19	954.6	28.69	971.6	29.19	988.5	29.69	1005.4	30.19	1022.4	30.69	1039.3
28.20	955.0	28.70	971.9	29.20	988.8	29.70	1005.8	30.20	1022.7	30.70	1039.6
28.21	955.3	28.71	972.2	29.21	989.2	29.71	1006.1	30.21	1023.0	30.71	1040.0
28.22	955.6	28.72	972.6	29.22	989.5	29.72	1006.4	30.22	1023.4	30.72	1040.3
28.23	956.0	28.73	972.9	29.23	989.8	29.73	1006.8	30.23	1023.7	30.73	1040.6
28.24	956.3	28.74	973.2	29.24	990.2	29.74	1007.1	30.24	1024.0	30.74	1041.0
28.25	956.7	28.75	973.6	29.25	990.5	29.75	1007.5	30.25	1024.4	30.75	1041.3
28.26	957.0	28.76	973.9	29.26	990.9	29.76	1007.8	30.26	1024.7	30.76	1041.7
28.27	957.3	28.77	974.3	29.27	991.2	29.77	1008.1	30.27	1025.1	30.77	1042.0
28.28	957.7	28.78	974.6	29.28	991.5	29.78	1008.5	30.28	1025.4	30.78	1042.3
28.29	958.0	28.79	974.9	29.29	991.9	29.79	1008.8	30.29	1025.7	30.79	1042.7
28.30	958.3	28.80	975.3	29.30	992.2	29.80	1009.1	30.30	1026.1	30.80	1043.0
28.31	958.7	28.81	975.6	29.31	992.6	29.81	1009.5	30.31	1026.4	30.81	1043.3
28.32	959.0	28.82	976.0	29.32	992.9	29.82	1009.8	30.32	1026.8	30.82	1043.7
28.33	959.4	28.83	976.3	29.33	993.2	29.83	1010.2	30.33	1027.1	30.83	1044.0
28.34	959.7	28.84	976.6	29.34	993.6	29.84	1010.5	30.34	1027.4	30.84	1044.4
28.35	960.0	28.85	977.0	29.35	993.9	29.85	1010.8	30.35	1027.8	30.85	1044.7
28.36	960.4	28.86	977.3	29.36	994.2	29.86	1011.2	30.36	1028.1	30.86	1045.0
28.37	960.7	28.87	977.7	29.37	994.6	29.87	1011.5	30.37	1028.4	30.87	1045.4
28.38	961.1	28.88	978.0	29.38	994.9	29.88	1011.9	30.38	1028.8	30.88	1045.7
28.39	961.4	28.89	978.3	29.39	995.3	29.89	1012.2	30.39	1029.1	30.89	1046.1
28.40	961.7	28.90	978.7	29.40	995.6	29.90	1012.5	30.40	1029.5	30.90	1046.4
28.41	962.1	28.91	979.0	29.41	995.9	29.91	1012.9	30.41	1029.8	30.91	1046.7
28.42	962.4	28.92	979.3	29.42	996.3	29.92	1013.2	30.42	1030.1	30.92	1047.1
28.43	962.8	28.93	979.7	29.43	996.6	29.93	1013.5	30.43	1030.5	30.93	1047.4
28.44	963.1	28.94	980.0	29.44	997.0	29.94	1013.9	30.44	1030.8	30.94	1047.7
28.45	963.4	28.95	980.4	29.45	997.3	29.95	1014.2	30.45	1031.2	30.95	1048.1
28.46	963.8	28.96	980.7	29.46	997.6	29.96	1014.6	30.46	1031.5	30.96	1048.4
28.47	964.1	28.97	981.0	29.47	998.0	29.97	1014.9	30.47	1031.8	30.97	1048.8
28.48	964.4	28.98	981.4	29.48	998.3	29.98	1015.2	30.48	1032.2	30.98	1049.1
28.49	964.8	28.99	931.7	29.49	998.6	29.99	1015.6	30.49	1032.5	30.99	1049.4

IV. TEMPERATURE

NORMAL MAXIMUM, MINIMUM, AND MEAN BY MONTHS
1951-1980

	MAXIMUM	MINIMUM	MEAN
January	65.2	39.4	52.3
February	69.7	42.5	56.1
March	74.5	46.7	60.6
April	83.1	53.0	68.0
May	92.4	61.5	77.0
June	102.3	70.6	86.5
July	105.0	79.5	92.3
August	102.3	77.5	89.9
September	98.2	70.9	84.6
October	87.7	59.1	73.4
November	74.3	46.9	60.6
December	66.4	40.2	53.3
Annual	85.1	57.3	71.2

HIGHEST MEAN AND LOWEST MEAN BY MONTHS AND YEAR OF OCCURRENCE
1896-1985

	HIGHEST	YEAR	LOWEST	YEAR
January	61.4	1986	43.2	1937
February	61.7	1977	48.6	1939
March	70.6	1972	54.3	1897
April	76.0	1981	62.4	1967
May	87.0	1984	69.0	1917
June	93.4	1981	79.0	1965
July	95.6	1980	85.4	1912
August	95.8	1981	84.6	1918
September	91.0	1983	78.9	1900 1912
October	78.7	1977	66.2	1916
November	66.2	1949	55.0	1922
December	61.3	1980	46.6	1911
Annual	76.0	1981	67.8	1964

Temperature

HIGHEST AND LOWEST MEAN MAXIMUM AND HIGHEST AND LOWEST MEAN MINIMUM BY MONTHS AND YEAR OF OCCURRENCE - 1896-1985

	MEAN MAXIMUM				MEAN MINIMUM			
	HIGHEST	YEAR	LOWEST	YEAR	HIGHEST	YEAR	LOWEST	YEAR
January	74.2	1986	53.5	1949	48.6	1986	31.9	1937
February	76.7	1977	60.5	1939	49.9	1986	33.4	1964
March	86.7	1972	67.3	1897 1958	57.2	1986	40.3	1917
April	90.6	1962	75.1	1900	63.1	1981	47.5	1967
May	101.2	1984	83.7	1917	72.8	1984	54.2	1917
June	108.6	1974	96.0	1967	80.8	1981	60.6	1965
July	108.3	1978	97.7	1912	84.8	1981	73.1	1912 1913
August	107.3	1962	97.0	1955	84.7	1981	71.3	1900
September	103.8	1979	93.6	1900	80.6	1983	63.6	1912 1965
October	95.8	1952	80.7	1919	67.0	1983	50.8	1923
November	82.3	1949	68.5	1931	52.5	1981	37.3	1916
December	74.9	1980	59.2	1909	48.2	1977	32.6	1916
Annual	88.3	1934	78.8	1953	64.0	1981	53.1	1917

Greatest number of consecutive months with average temperature below normal:

13 Months from May 1916 through May 1917

Greatest number of consecutive months with average temperature above normal:

34 Months from June 1980 through March 1983

Temperature

HIGHEST MAXIMUM AND LOWEST MINIMUM BY MONTHS AND DAY AND YEAR OF OCCURRENCE
1896-1985

	HIGHEST MAXIMUM	DAY	YEAR	LOWEST MINIMUM	DAY	YEAR
January	88	19	1971	16	7	1913
February	92	25	1921	24	7	1899
		27	1986		8	1933
March	98	27	1986	25	4	1966
April	103	14	1925	35	10	1922
May	114	30	1910	39	3	1899
June	118	24	1929	49	4	1908
July	118	16	1925	63	4	1912
		11	1958		5	1912
August	116	1	1972	58	20	1917
		4	1975			
September	116	1	1950	47	22	1895
					20	1965
					21	1965
October	107	1	1980	34	30	1971
		2	1980			
November	96	1	1924	27	23	1931
		2	1924			
December	87	10	1950	22	31	1900
					26	1911
Annual	118 JUL	16	1925	16 JAN	7	1913
	JUN	24	1929			
	JUL	11	1958			

Temperature

LOWEST MAXIMUM AND HIGHEST MINIMUM BY MONTHS AND DAY AND YEAR OF OCCURRENCE
1896-1985

	LOWEST MAXIMUM	DAY	YEAR	HIGHEST MINIMUM	DAY	YEAR
January	39	6	1913	59	22	1976
		21	1937			
February	46	6	1899	62	22	1977
		8	1903		28	1986
March	49	2	1915	74	28	1986
April	52	1	1949	76	29	1981
May	54	1	1915	86	29	1983
June	68	2	1899	92	29	1976
July	79	1	1911	92	6	1983
August	73	27	1951	91	19	1982
September	66	23	1895	90	3	1982
					3	1983
October	56	30	1959	78	4	1977
November	40	28	1919	67	13	1983
December	36	10	1898	59	1	1949
Annual	36 DEC	10	1898	92 JUN	29	1976
				92 JUL	6	1983

Temperature

GREATEST AND LEAST MONTHLY TEMPERATURE RANGE BY MONTHS AND YEAR OF OCCURRENCE
1896-1985

	GREATEST RANGE	YEAR	LEAST RANGE	YEAR
January	69	1971	36	1957
February	61	1921	37	1920
March	67	1966	35	1980
April	62	1949	44	1931
May	66	1910	40	1981
June	63	1929	38	1986
July	50	1905	33	1959 1981
August	51	1918 1962	31	1955
September	58	1945	35	1981
October	66	1917	33	1983
November	67	1931	38	1986
December	58	1911	36	1983
Annual	95	1971	77	1984

Temperature

HOTTEST AND COOLEST SUMMERS 1896-1985
(June, July, August, and September Combination)

HOTTEST		COOLEST	
93.4	1981	84.1	1912
92.0	1977	84.2	1913
91.9	1983	84.4	1923
91.0	1980	84.6	1965
90.9	1986	85.1	1964
90.8	1974 1978	85.2	1911

HOTTEST THREE SUCCESSIVE MONTHS
(Combination)

94.8	June, July, August	1981
93.9	June, July, August	1985
93.5	June, July, August	1977
93.2	June, July, August	1986
93.0	July, August, September	1983
92.3	June, July, August	1978
92.2	June, July, August	1980

HOTTEST TWO SUCCESSIVE MONTHS
(Combination)

95.5	July, August	1981
94.7	July, August	1985
94.6	July, August	1977
94.1	July, August	1983
93.9	July, August	1980
93.8	July, August	1969 1970

HOTTEST MONTH

95.8	August	1981
95.6	July	1980
95.5	July	1983
95.2	July	1931 1981
95.0	July	1933 1970 1977

WARMEST AND COLDEST WINTERS 1896-1985
(December, January, February Combination)

WARMEST		COLDEST	
60.6	1980-1981	49.3	1963-1964
59.4	1985-1986	49.8	1948-1949
58.4	1977-1978	50.0	1916-1917
58.2	1983-1984	52.2	1945-1946

COLDEST TWO SUCCESSIVE MONTHS

48.0	January, February	1964
48.2	December, January	1936-1937
48.3	December, January	1948-1949
48.4	December, January	1931-1932
48.7	January, February	1949

COLDEST MONTH

43.2	January	1937
44.6	January	1949
46.6	December	1911
47.0	January	1932
47.1	December	1916

Temperature

RECORD HIGH DEW POINTS IN DEGREES AND DATES OF OCCURRENCE
1896-1985

HIGHEST HOURLY DEW POINTS

79	July	19	1957	76	August	4	1943
78	August	9	1977	76	July	31	1945
78	August	20	1978	76	July	17	1953
77	August	1	1951	76	July	22	1966
76	July	10	1899	76	August	19	1966
76	August	10	1913				

HIGHEST DAILY AVERAGE DEW POINTS

74	August	4	1943	73	August	19	1966

HIGHEST MONTHLY AVERAGE DEW POINTS

68	August		1955	67	August		1943

RECORD LOW DEW POINTS IN DEGREES AND DATES OF OCCURRENCE
1896-1985

LOWEST HOURLY DEW POINTS

-23	November	28	1976	-13	February	3	1972
-22	December	21	1977	-13	April	13	1974
-15	January	29	1970	-12	March	10	1977
-14	February	2	1972	-11	February	4	1972

LOWEST DAILY AVERAGE DEW POINTS

-10	December	21	1977	-5	February	3	1972

LOWEST MONTHLY AVERAGE DEW POINTS

20	February		1972	21	March		1977

RECORD LOW HOURLY HUMIDITIES IN PERCENT AND DATES OF OCCURRENCE
1896-1985

2	May	8	1904	2	December	21	1977
2	May	16	1907	2	April	21	1979
2	May	13	1976	2	June	4	1982

Temperature

HEAT INDEX

Most people are familiar with the term "wind-chill factor" which gives the combined effects of wind and temperature as an equivalent calm air temperature. For example, if the temperature is 0°F and the wind is 5 mph, the wind-chill factor is -5°F; at 10 mph, it is -22°F; and at 20 mph it is -39°F. Just as an increase in wind makes the cold air more unbearable, so does an increase in the moisture content of the air make the high summer temperatures more uncomfortable.

In most sections of the country, people look forward to summer. In the desert southwest, however, summer is the most undesirable time of the year. The term "Heat Index" is an apparent temperature based on the actual temperature and the amount of moisture in the air. The Heat Index Graph, devised by the National Weather Service, uses temperature and humidity values to determine the heat index. The areas of the graph are labeled: very warm, hot, very hot, and extremely hot. Most of the typical sunny summer days in the high country of Arizona fall into the very warm category. At the 5000-foot level, they fall into the hot, and in the lower deserts, they are in the very hot area of the graph. The chart also gives the heat syndrome for each classification.

The dew point, or the temperature to which the air must be cooled before condensation can take place, gives a true value of how much moisture is actually in the air. By knowing the temperature and dew point, the humidity can be determined. Using the temperature and humidity, the heat index can be arrived at by using the graph.

The prolonged summer heat with maximum temperatures generally between 105 and 110 degrees in the Phoenix area causes some degree of fatigue in most people. Exhaustion and even heatstroke or sunstroke are possible with prolonged outdoor activity. This is especially true during much of July and August when the atmosphere becomes laden with tropical moisture.

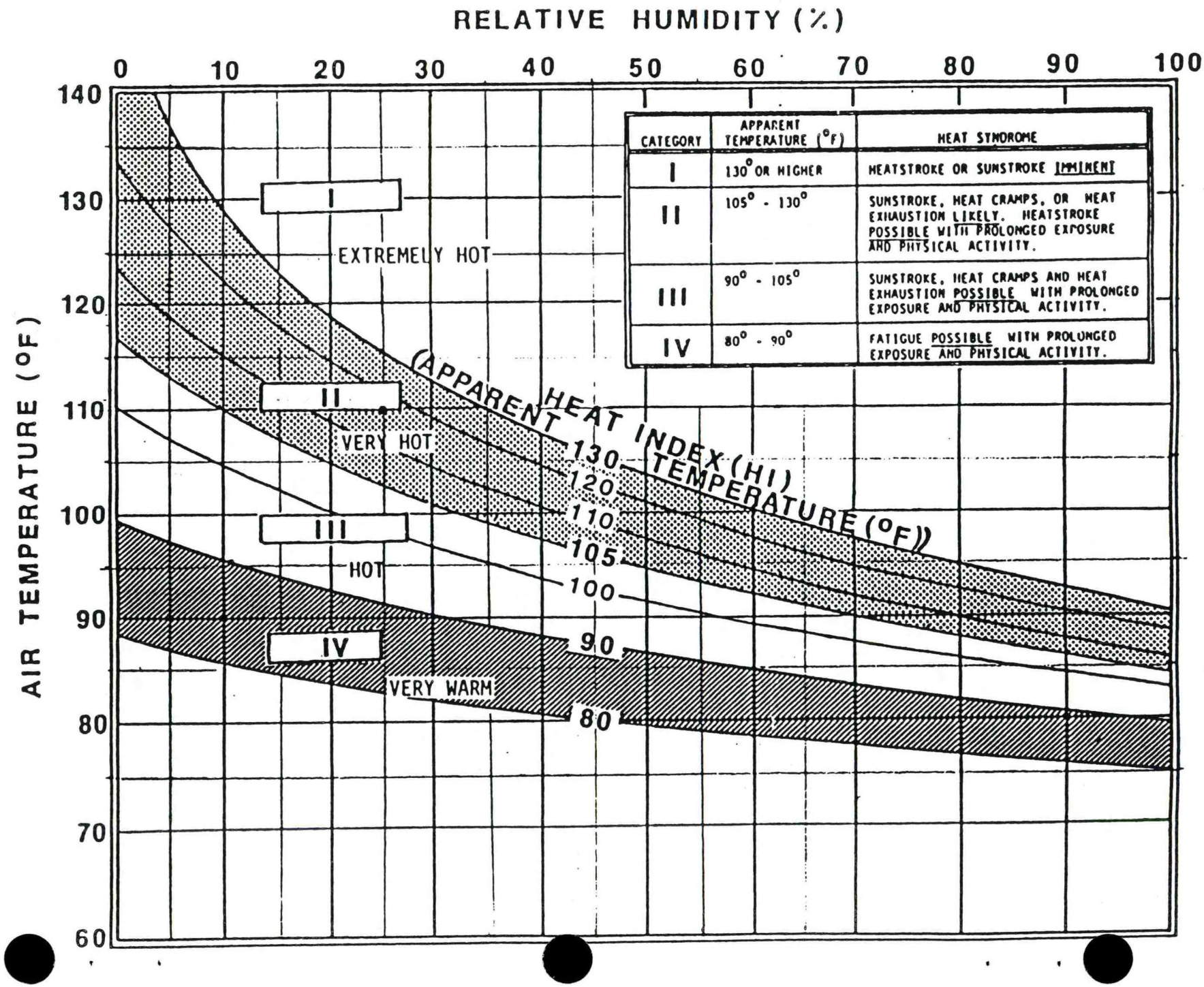
Temperature

HEAT INDEX

Phoenix records were checked back to 1896 to find the highest humidity ever for each temperature from 100 through 118 degrees.

TEMPERATURE	DEW POINT	HUMIDITY	HEAT INDEX
100	75	45	112
101	74	43	112
102	69	35	110
103	69	34	110
104	68	32	111
105	69	32	113
106	67	29	112
107	66	27	112
108	68	28	116
109	66	26	116
110	62	22	113
111	63	22	116
112	59	18	113
113	59	18	115
114	57	16	114
115	56	15	115
116	56	15	117
117	56	14	117
118	56	14	118

It is interesting to note that with high moisture content, with humidities in the 30% and 40% range, the temperature never reached over 105 degrees. It is only with very dry air that temperatures climbed over 112 degrees. This is nature's way of not allowing conditions to get entirely out of hand.


RELATIVE HUMIDITY (%)
0
10
20
30
40
50
60
70
80
90
100
AIR TEMPERATURE (°F)
140
130
120
110
100
90
80
70
60
I
EXTREMELY HOT
II
VERY HOT
III
HOT
IV
VERY WARM
(APPARENT HEAT INDEX (HI) TEMPERATURE (°F))
130
120
110
105
100
90
80
CATEGORY
APPARENT TEMPERATURE (°F)
HEAT SYNDROME
I
130° OR HIGHER
HEATSTROKE OR SUNSTROKE IMMINENT
II
105° - 130°
SUNSTROKE, HEAT CRAMPS, OR HEAT EXHAUSTION LIKELY. HEATSTROKE POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.
III
90° - 105°
SUNSTROKE, HEAT CRAMPS AND HEAT EXHAUSTION POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.
IV
80° - 90°
FATIGUE POSSIBLE WITH PROLONGED EXPOSURE AND PHYSICAL ACTIVITY.

THE MYTH OF INCREASING MOISTURE LEVELS IN PHOENIX

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Is Phoenix becoming more humid? Many local residents believe that irrigated landscaping, swimming pools, and lakes and canals in new housing developments around the city are forcing moisture levels noticeably upward. However, many scientists have shown that cities usually act to decrease moisture levels in the atmosphere. This is caused by (a) paved surfaces that store little moisture and force rapid runoff following a rain event and (b) increased temperature in the "urban heat island".

Despite local interest in atmosphere moisture trends in the valley, surprisingly little scientific research has directly addressed this issue.

We decided to examine the Phoenix, Arizona, weather records from 1896-1984 to see if there has been a change in the humidity of the Phoenix urban area. We chose relative humidity and dew point temperatures for statistical analysis. The dew point temperature is a better indicator of the amount of moisture in the air, which is the major contributor to human discomfort.

Since Arizona has a distinct two season rainfall pattern (a monsoon season, July through September and a winter season, December through April), we chose the months of May, June, October, and November for analysis. These transition months should be the least affected by large-scale weather disturbances since they are in between the precipitation seasons. Thus any urban effect on humidity should be clearly evident.

We chose six different relatively sophisticated statistical techniques to analyze the time series patterns in the atmospheric moisture data. These techniques basically search for "climatic signals" that may be contained in the "noisy" variance patterns in our data. These statistical procedures allow us to make conclusions regarding any trends, cycles, or discontinuities in the moisture records.

The results for the dew points were somewhat surprising. In May, October, and November, our statistical procedures indicated that the variations in the data were random; however, some form of non-random variation appeared to exist in the June dew points. Our analyses showed that trend was not the source of non-random inter-annual variation in June (or any other month). The systematic variations in June were found to be related in several significant cycles in the data. One cycle showed a maximum occurring in 1943, and a minimum 1898. This important cycle shows that we are presently heading towards another minimum projected for 1987. Another cyclical pattern showed maxima in 1917 and 1962, and minima in 1939 and 1984. Clearly dew points are not rising in Phoenix.

Given the steady or falling dew points, and assuming the highly probable occurrence of some urban heat island effects (higher temperatures in the city), the relative humidity values should display decreasing levels, again contrary to popular opinion. All of our statistics from each month indicated

a strong downward trend in the relative humidity levels. The levels display a peak in the 1920s and a pronounced minimum in the 1970s and 1980s. So we have concluded that while increases in irrigated and sprinkled areas and open water surfaces may have occurred in the growing Phoenix area, many other effects of urbanization have apparently produced an overriding, counteracting impact on the atmospheric moisture levels.

AVERAGE RELATIVE HUMIDITY IN PERCENT BY FIVE-YEAR PERIODS
1896-1985

1896-1900	38	1926-1930	41	1956-1960	41
1901-1905	39	1931-1935	40	1961-1965	38
1906-1910	44	1936-1940	40	1966-1970	40
1911-1915	44	1941-1945	47	1971-1975	35
1916-1920	48	1946-1950	41	1976-1980	36
1921-1925	44	1951-1955	43	1981-1985	39

These values of relative humidity are averages of the five years. The yearly averages are based on the averages of the twelve months. The monthly averages are based on daily values taken at 5 a.m. and 5 p.m.

These data also show high values in the 1910s and 1920s and low values in the 1970s and 1980s. This is in good agreement with the above research project.

It again points out that with urbanization, more buildings of all kinds, more paved surfaces and the heat island effect, the relative humidity decreases.

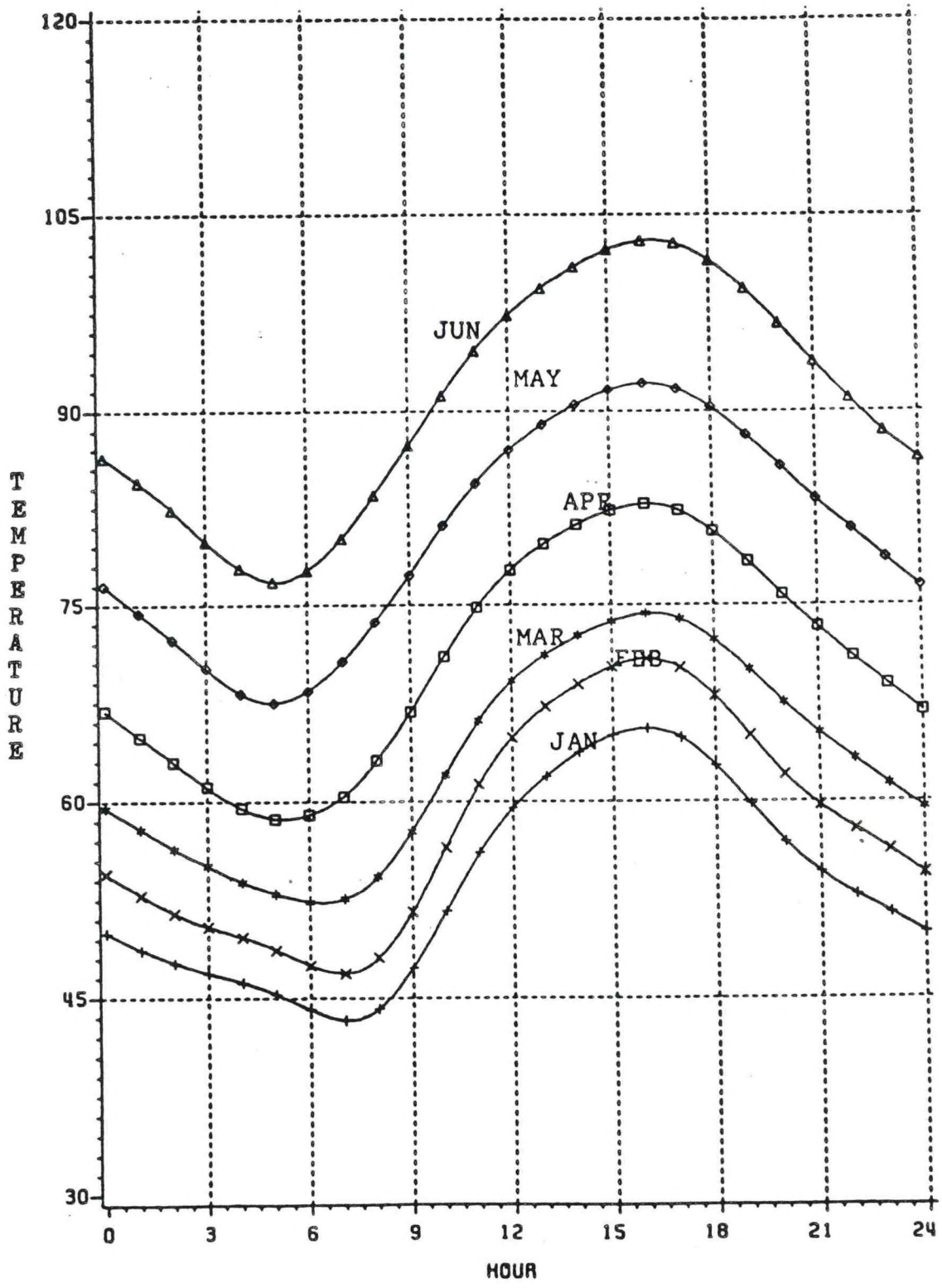
DAILY NORMALS OF MAXIMUM, MINIMUM AND AVERAGE TEMPERATURES 1951-1980

JANUARY TEMPERATURE			FEBRUARY TEMPERATURE			MARCH TEMPERATURE			APRIL TEMPERATURE			MAY TEMPERATURE			JUNE TEMPERATURE		
MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG
65	39	52	67	41	54	72	44	58	79	50	64	88	57	72	98	66	82
65	39	52	67	41	54	72	45	58	79	50	64	88	57	73	99	66	83
64	39	52	68	41	54	72	45	58	79	50	65	88	58	73	99	67	83
64	39	52	68	41	55	72	45	58	80	50	65	88	58	73	99	67	83
64	39	51	68	41	55	72	45	59	80	50	65	89	58	74	99	67	83
64	39	51	68	41	55	72	45	59	80	51	65	89	59	74	100	67	84
64	39	52	69	42	55	73	45	59	81	51	66	89	59	74	100	66	84
64	39	52	69	42	55	73	45	59	81	51	66	90	59	74	101	68	84
65	39	52	69	42	55	73	46	59	81	51	66	90	60	75	101	68	85
65	39	52	69	42	55	73	46	59	81	52	66	90	60	75	101	69	85
65	39	52	69	42	56	73	46	60	82	52	67	91	60	75	102	69	85
65	39	52	69	42	56	73	46	60	82	52	67	91	60	76	102	69	86
65	39	52	70	42	56	74	46	60	82	52	67	91	61	76	102	70	86
65	39	52	70	42	56	74	46	60	83	52	68	91	61	76	102	70	86
65	39	52	70	43	56	74	46	60	83	53	68	92	61	77	103	70	87
65	39	52	70	43	56	74	47	60	83	53	68	92	62	77	103	71	87
65	39	52	70	43	57	74	47	61	84	53	68	93	62	77	103	71	87
65	39	52	70	43	57	75	47	61	84	53	69	93	62	78	103	71	
65	39	52	71	43	57	75	47	61	84	54	69	93	62	78	103	72	
65	39	52	71	43	57	75	47	61	84	54	69	94	63	78	104	72	88
65	40	52	71	43	57	75	47	61	85	54	69	94	63	79	104	72	88
65	40	52	71	43	57	76	42	62	85	55	70	94	63	79	104	73	88
66	40	53	71	44	57	76	48	62	85	55	70	95	63	79	104	73	89
66	40	53	71	44	57	76	48	62	86	55	70	95	64	80	104	73	89
66	40	53	71	44	58	76	48	62	86	55	71	95	64	80	104	74	89
66	40	53	71	44	58	77	48	63	86	56	71	96	64	80	105	74	89
66	40	53	72	44	58	77	49	63	87	56	71	96	65	80	105	75	90
66	40	53	72	44	58	77	49	63	87	56	72	97	65	81	105	75	90
67	40	53				78	49	63	87	57	72	97	65	81	105	75	90
67	41	54				78	49	64	87	57	72	97	65	81	105	76	90
67	41	54				78	49	64				98	66	82			
65.2	39.4	52.3	69.7	42.5	56.1	74.5	46.7	60.6	83.1	53.0	68.0	92.4	61.5	77.0	102.3	70.6	86.5

DAILY NORMALS OF MAXIMUM, MINIMUM AND AVERAGE TEMPERATURES 1951-1980

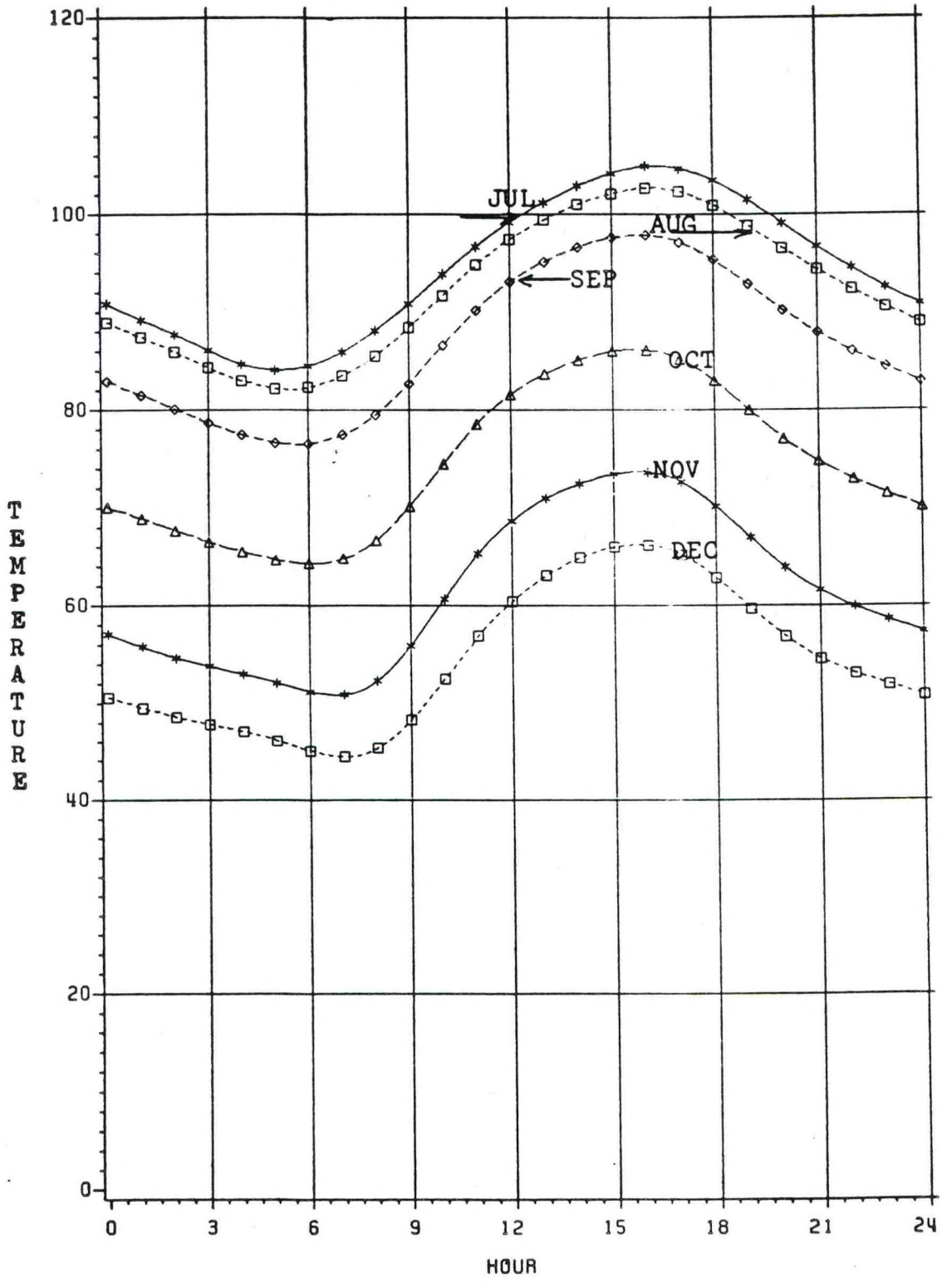
JULY TEMPERATURE			AUGUST TEMPERATURE			SEPTEMBER TEMPERATURE			OCTOBER TEMPERATURE			NOVEMBER TEMPERATURE			DECEMBER TEMPERATURE		
MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG
105	76	91	104	80	92	101	75	88	94	66	80	80	52	66	69	42	56
105	77	91	104	80	92	101	75	88	94	65	79	80	52	66	69	42	56
105	77	91	104	80	92	101	74	87	93	65	79	79	51	65	69	42	55
105	77	91	104	79	92	101	74	87	93	64	79	79	51	65	68	42	55
105	78	91	103	79	91	100	74	87	92	64	78	78	50	64	68	42	55
105	78	92	103	79	91	100	74	87	92	63	78	78	50	64	68	41	55
105	78	92	103	79	91	100	73	87	92	63	77	78	50	64	68	41	54
105	79	92	103	79	91	100	73	87	91	63	77	77	49	63	67	41	54
105	79	92	103	79	91	100	73	86	91	62	76	77	49	63	67	41	54
105	79	92	103	79	91	100	73	86	90	62	76	76	49	62	67	41	54
106	79	92	103	78	91	99	73	86	90	61	76	76	48	62	67	41	54
106	79	92	103	78	90	99	72	86	90	61	75	75	48	62	67	41	54
105	80	93	103	78	90	99	72	86	89	60	75	75	47	61	67	40	53
105	80	93	102	78	90	99	72	85	89	60	74	75	47	61	66	40	53
105	80	93	102	78	90	99	71	85	88	60	74	74	47	60	66	40	53
105	80	93	102	78	90	98	71	85	88	59	73	74	46	60	66	40	53
105	80	93	102	77	90	98	71	85	87	59	73	73	46	60	66	40	53
105	80	93	102	77	90	98	70	84	87	58	73	73	46	59	66	40	53
105	81	93	102	77	89	98	70	84	87	58	72	73	46	59	66	40	53
105	81	93	102	77	89	97	70	84	86	57	72	72	45	59	66	40	53
105	81	93	102	77	89	97	69	83	86	57	71	72	45	59	65	39	52
105	81	93	102	76	89	97	69	83	85	56	71	72	45	58	65	39	52
105	81	93	102	76	89	97	69	83	85	56	80	81	44	58	65	39	52
105	81	93	101	76	89	96	68	82	84	56	70	71	44	58	65	39	52
105	81	93	101	76	89	96	68	82	84	55	69	71	44	57	65	39	52
105	81	93	101	76	89	96	68	82	83	55	69	71	44	57	65	39	52
105	80	92	101	76	88	95	67	81	83	54	69	70	43	57	65	39	52
105	80	92	101	75	88	95	67	81	82	54	68	70	43	57	65	39	52
105	80	92	101	75	88	95	66	81	82	53	68	70	43	56	65	39	52
104	80	92	101	75	88	94	66	80	81	53	67	69	43	56	65	39	52
105.0	79.5	92.3	102.3	77.5	89.9	98.2	70.9	84.6	87.7	59.1	73.4	74.3	46.9	60.6	66.4	40.2	53.3

HOURLY TEMPERATURES BY MONTH AT PHOENIX, ARIZONA.



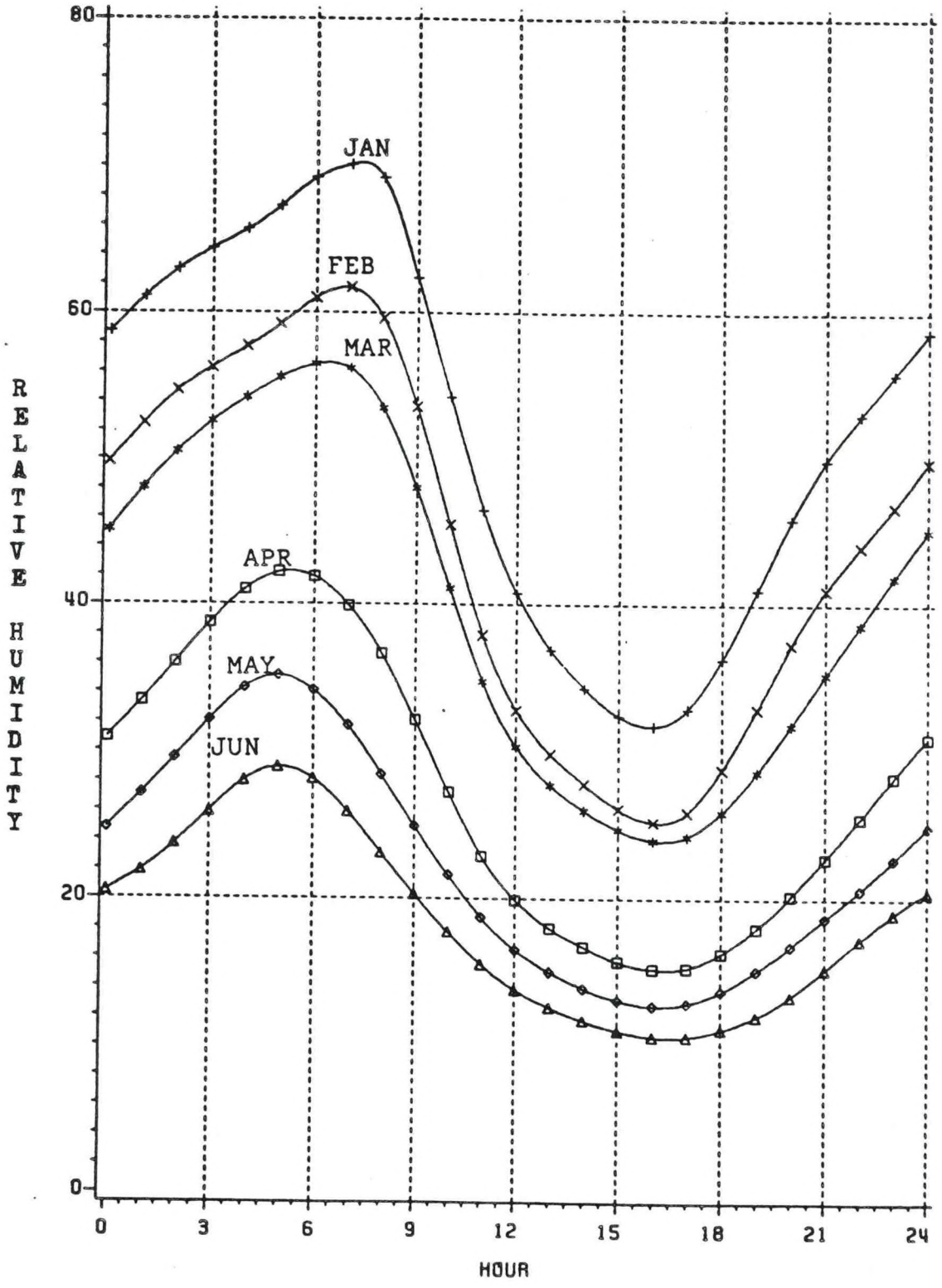
DATABASE IS 1971 - 1985

HOURLY TEMPERATURES BY MONTH AT PHOENIX, ARIZONA.



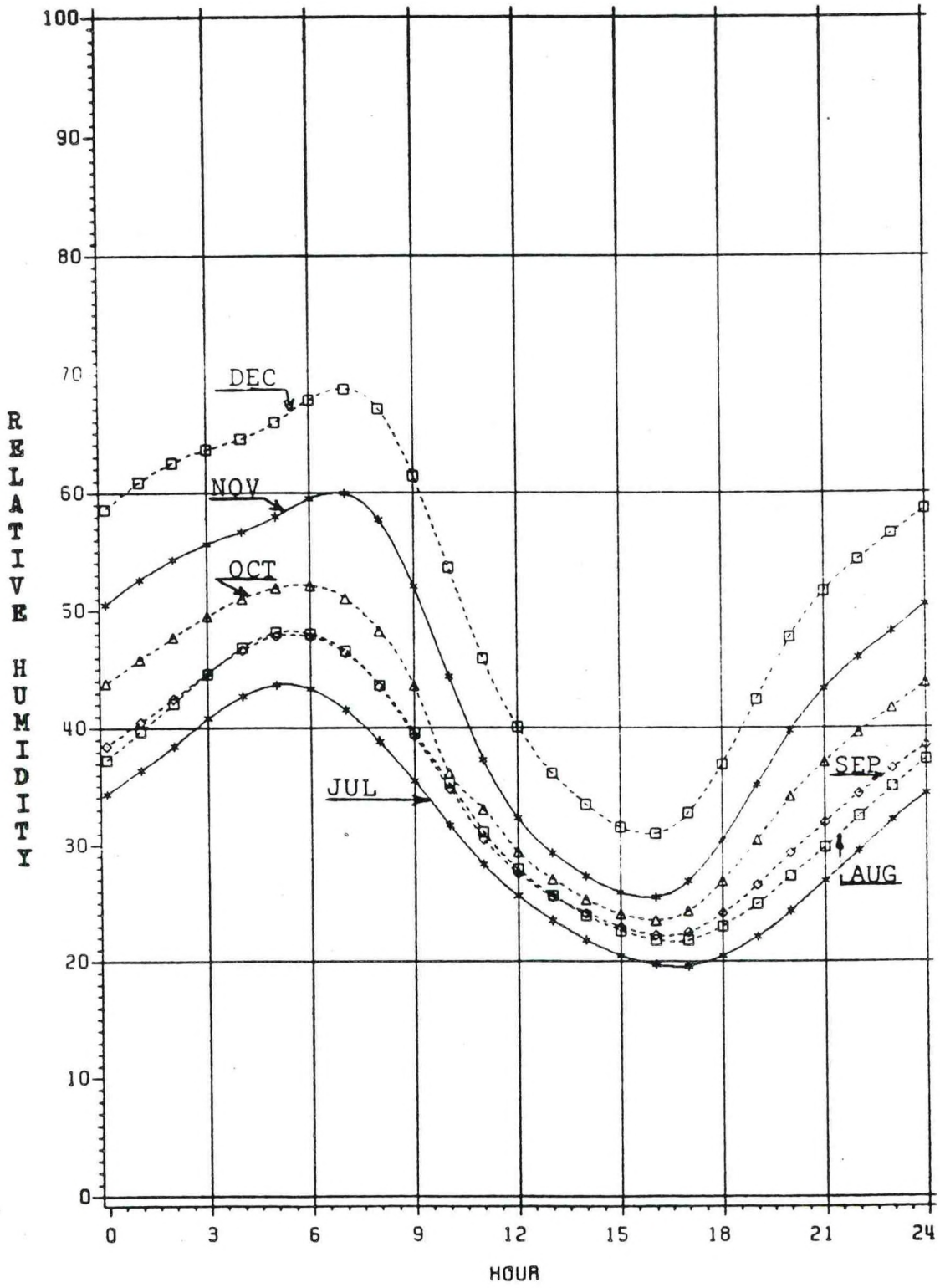
DATA BASE IS 1971 - 1985

HOURLY HUMIDITIES BY MONTH AT PHOENIX, ARIZONA.



DATABASE IS 1971 - 1985.

HOURLY HUMIDITIES BY MONTH AT PHOENIX, ARIZONA.

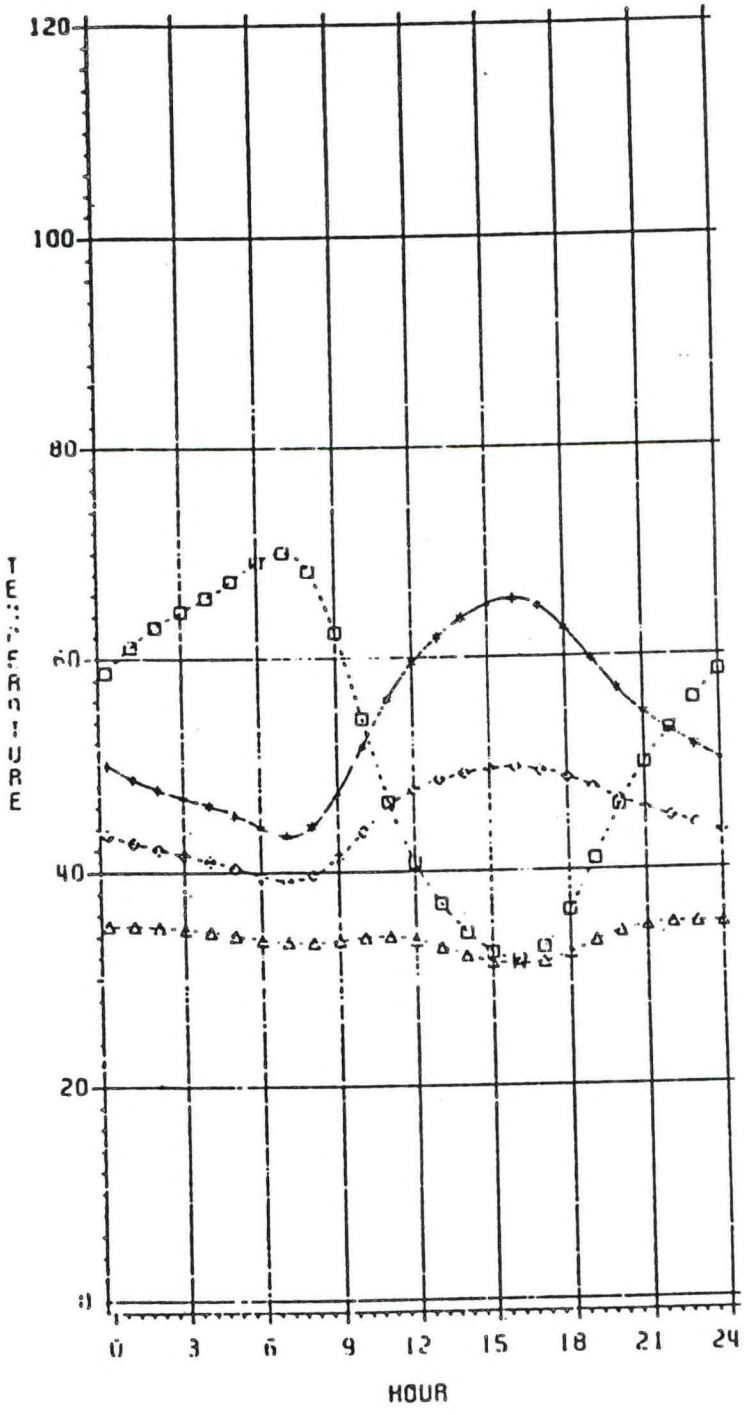


DATA BASE IS 1971 - 1985.

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN JANUARY

MONTH = 1

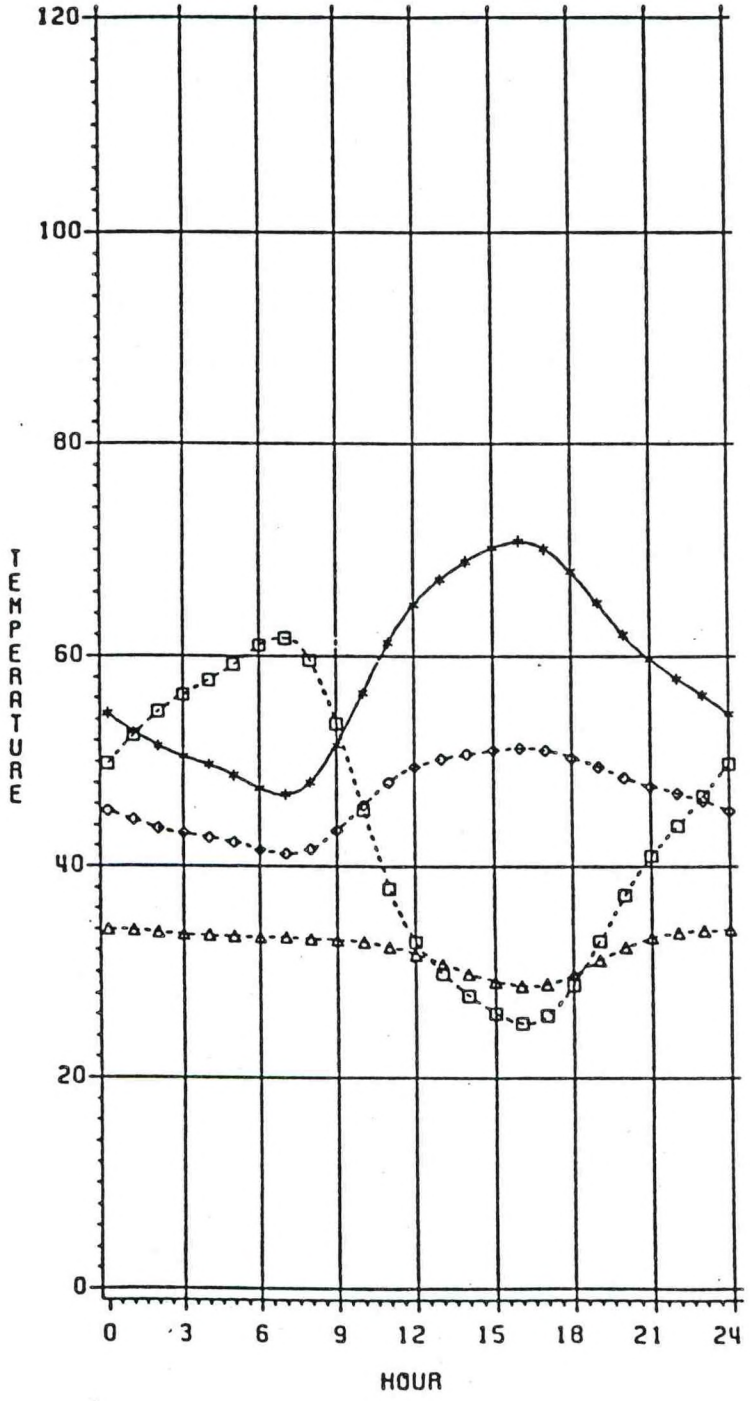
HR	TEMP	RH	WB	DP
0.	50.0	58.7	43.4	35.0
1.	48.7	61.1	42.7	35.0
2.	47.7	63.0	42.1	34.9
3.	46.9	64.4	41.6	34.7
4.	46.2	65.7	41.0	34.4
5.	45.3	67.3	40.4	34.1
6.	44.1	69.2	39.6	33.7
7.	43.3	70.1	39.2	33.5
8.	44.2	68.2	39.7	33.4
9.	47.3	62.4	41.4	33.6
10.	51.7	54.3	43.7	33.9
11.	56.1	46.5	46.0	34.0
12.	59.5	40.8	47.6	33.6
13.	61.9	36.9	48.5	32.9
14.	63.7	34.3	49.1	32.1
15.	65.0	32.4	49.5	31.5
16.	65.5	31.7	49.6	31.3
17.	64.9	32.9	49.3	31.5
18.	62.7	36.3	48.6	32.3
19.	59.8	41.0	47.6	33.4
20.	56.5	45.9	46.5	34.3
21.	54.6	49.9	45.6	34.8
22.	52.9	53.1	44.8	35.0
23.	51.5	55.9	44.1	35.0



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN FEBRUARY

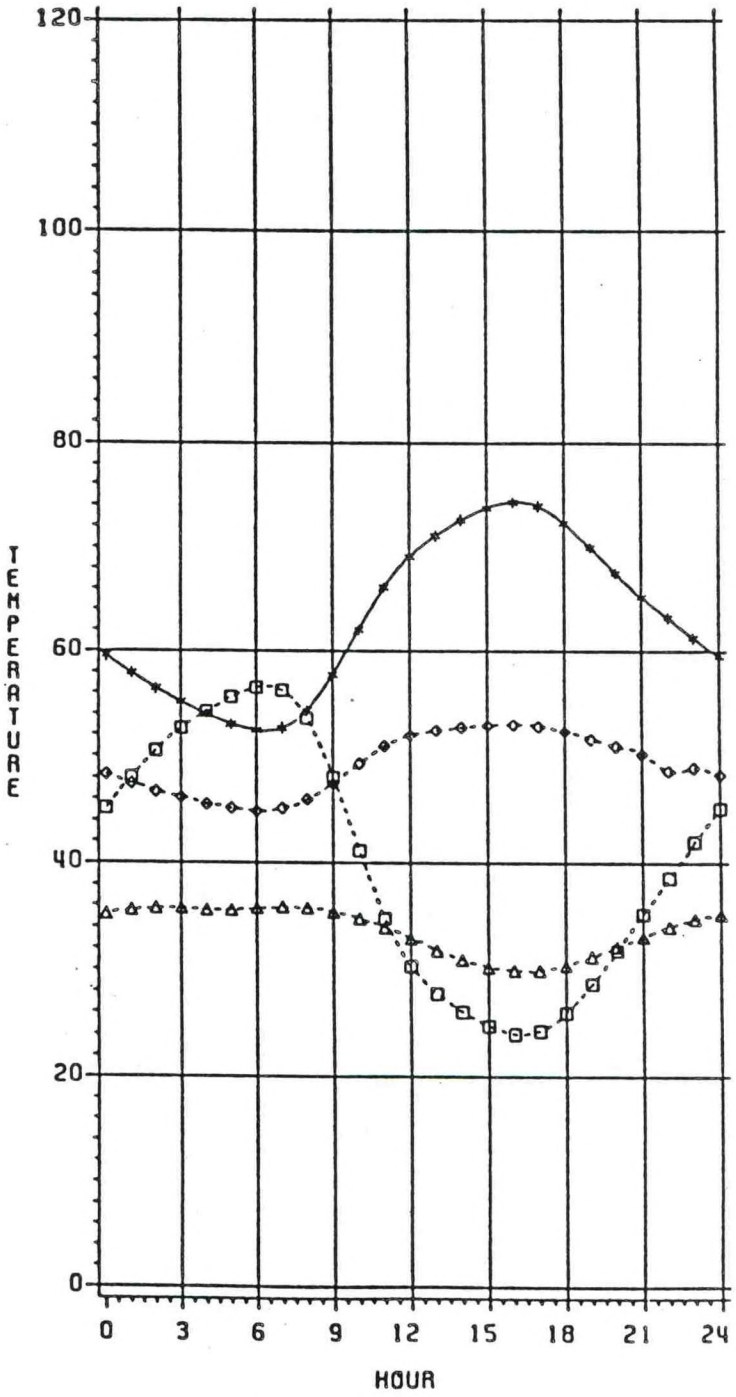
HR	TEMP	RH	WB	DP
0.	54.5	49.8	45.4	34.0
1.	52.9	52.5	44.5	33.9
2.	51.5	54.7	43.7	33.7
3.	50.5	56.3	43.2	33.5
4.	49.7	57.7	42.8	33.4
5.	48.7	59.2	42.3	33.3
6.	47.5	61.0	41.6	33.2
7.	46.9	61.7	41.2	33.2
8.	48.1	59.6	41.7	33.1
9.	51.6	53.6	43.5	33.0
10.	56.5	45.5	45.9	32.8
11.	61.3	37.9	48.1	32.3
12.	64.8	32.8	49.5	31.6
13.	67.2	29.8	50.3	30.7
14.	68.9	27.8	50.7	29.8
15.	70.2	26.1	51.1	29.1
16.	70.8	25.2	51.3	28.7
17.	70.1	25.9	51.1	28.9
18.	68.0	28.8	50.4	29.8
19.	65.0	32.9	49.5	31.1
20.	62.0	37.3	48.5	32.3
21.	59.7	41.0	47.7	33.2
22.	57.9	44.0	47.0	33.7
23.	56.3	46.8	46.3	33.9



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN MARCH

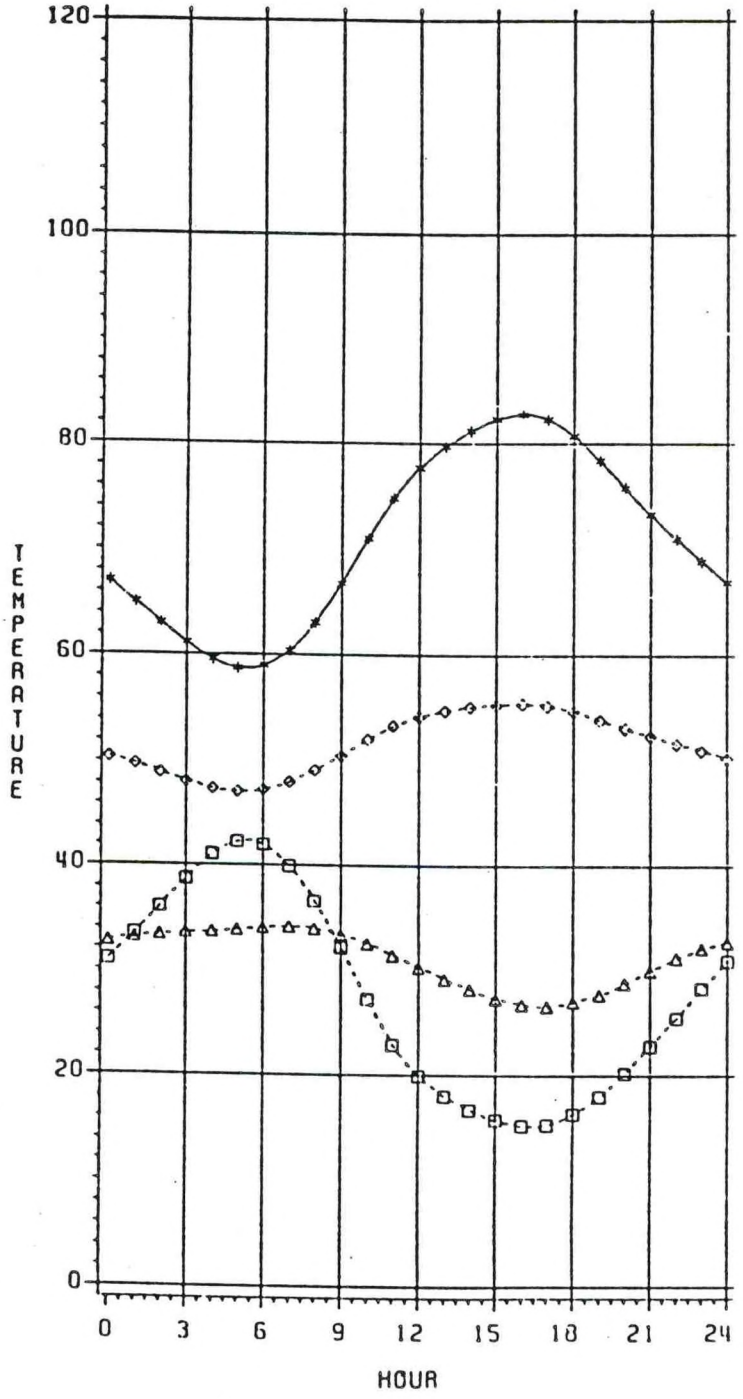
HR	TEMP	RH	WB	DP
0.	59.5	45.1	48.2	35.2
1.	57.9	48.0	47.4	35.6
2.	56.4	50.5	46.7	35.7
3.	55.1	52.6	46.1	35.7
4.	53.9	54.2	45.5	35.6
5.	53.0	55.6	45.1	35.6
6.	52.4	56.5	44.9	35.7
7.	52.6	56.2	45.1	35.8
8.	54.3	53.5	45.9	35.7
9.	57.7	48.0	47.4	35.4
10.	62.0	41.1	49.3	34.7
11.	66.1	34.7	50.9	33.9
12.	69.1	30.3	51.9	32.9
13.	71.1	27.7	52.4	31.8
14.	72.6	26.0	52.7	30.9
15.	73.7	24.7	52.9	30.2
16.	74.3	24.0	53.0	29.9
17.	73.9	24.3	52.8	29.9
18.	72.3	25.9	52.3	30.4
19.	70.0	28.6	51.6	31.2
20.	67.5	31.8	50.9	32.1
21.	65.2	35.2	50.2	33.1
22.	63.2	38.6	49.6	34.0
23.	61.3	41.9	48.9	34.7



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN APRIL

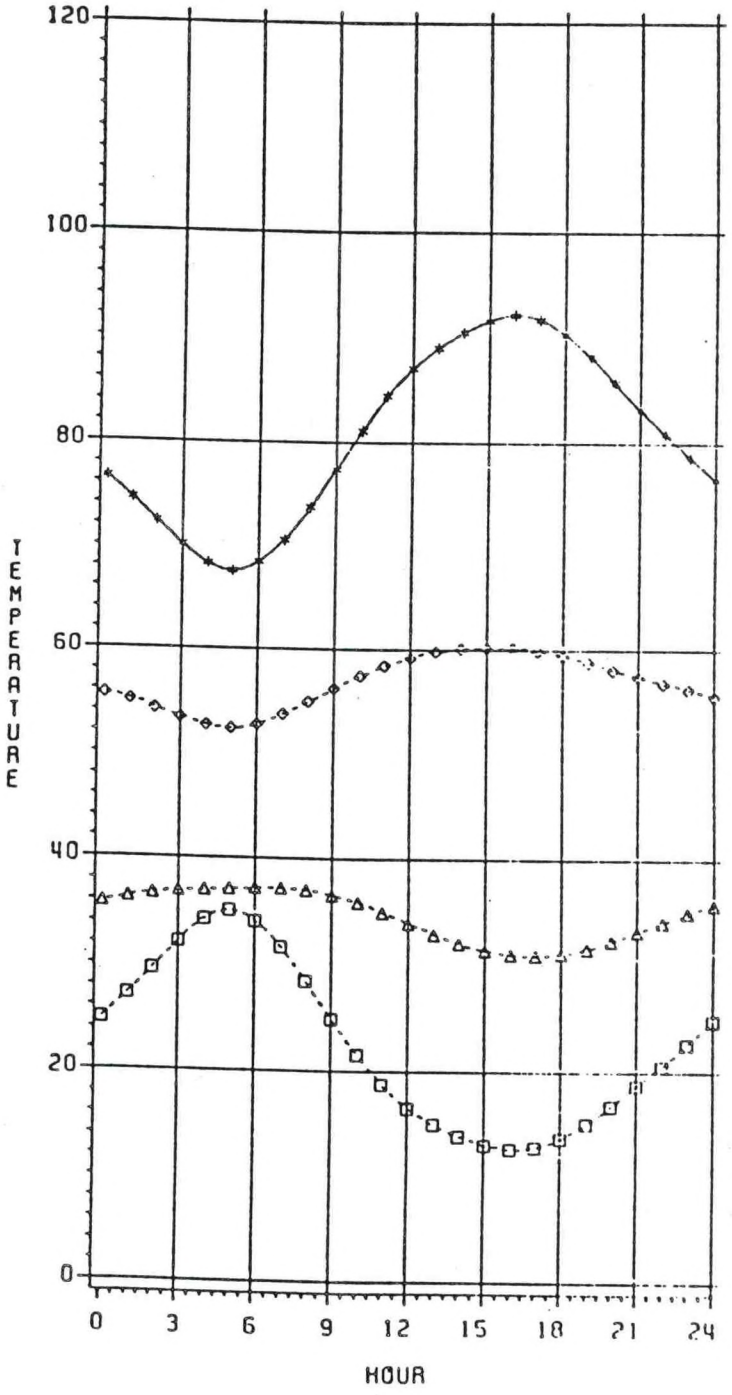
HR	TEMP	RH	WB	DP
0.	66.9	30.9	50.4	32.7
1.	64.9	33.4	49.7	33.1
2.	63.0	36.0	48.9	33.3
3.	61.1	38.7	48.1	33.5
4.	59.5	41.0	47.4	33.6
5.	58.7	42.2	47.1	33.8
6.	59.0	41.9	47.3	34.0
7.	60.4	39.9	48.1	34.1
8.	63.1	36.6	49.2	33.9
9.	66.8	32.1	50.6	33.3
10.	71.0	27.2	52.1	32.5
11.	74.8	22.9	53.4	31.4
12.	77.7	19.9	54.3	30.3
13.	79.7	18.0	54.8	29.2
14.	81.2	16.7	55.2	28.2
15.	82.3	15.7	55.4	27.3
16.	82.8	15.2	55.5	26.8
17.	82.3	15.3	55.3	26.6
18.	80.7	16.3	54.8	27.0
19.	78.4	18.0	54.0	27.7
20.	75.8	20.2	53.2	28.8
21.	73.3	22.8	52.5	30.0
22.	71.0	25.5	51.8	31.2
23.	68.9	28.3	51.1	32.1



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN MAY

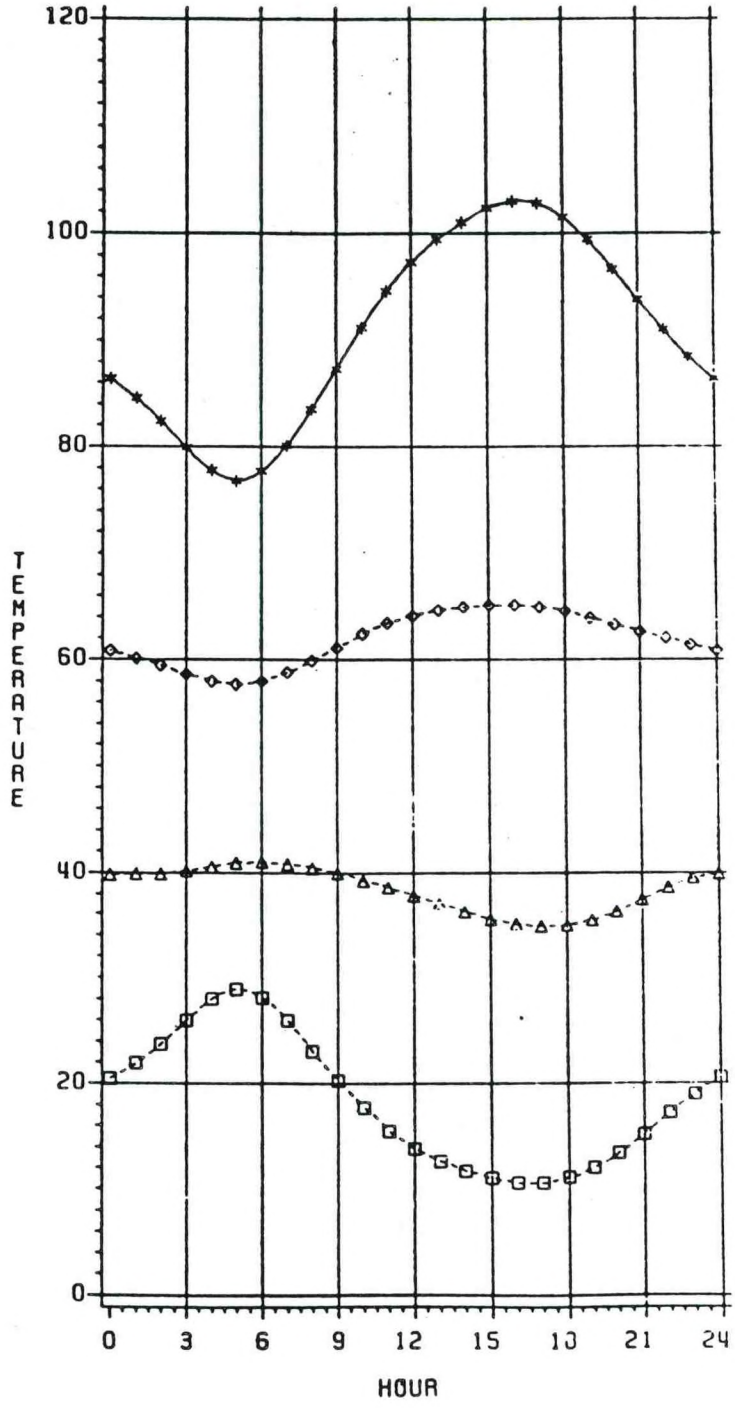
HR	TEMP	RH	WB	DP
0.	76.5	24.8	55.6	35.8
1.	74.4	27.1	55.0	36.3
2.	72.3	29.5	54.2	36.7
3.	70.1	32.1	53.3	36.9
4.	68.2	34.3	52.6	37.0
5.	67.5	35.1	52.3	37.1
6.	68.4	34.1	52.7	37.2
7.	70.6	31.7	53.7	37.2
8.	73.7	28.4	54.9	37.0
9.	77.3	24.9	56.2	36.6
10.	81.1	21.6	57.4	35.9
11.	84.4	18.7	58.4	35.0
12.	87.0	16.5	59.2	34.0
13.	89.0	15.0	59.8	33.0
14.	90.5	13.9	60.1	32.1
15.	91.6	13.1	60.2	31.5
16.	92.1	12.7	60.2	31.1
17.	91.7	12.9	59.9	31.0
18.	90.3	13.7	59.4	31.2
19.	88.2	15.1	58.8	31.7
20.	85.7	16.8	58.1	32.4
21.	83.2	18.7	57.4	33.3
22.	80.9	20.6	56.8	34.2
23.	78.6	22.7	56.2	35.1



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN JUNE

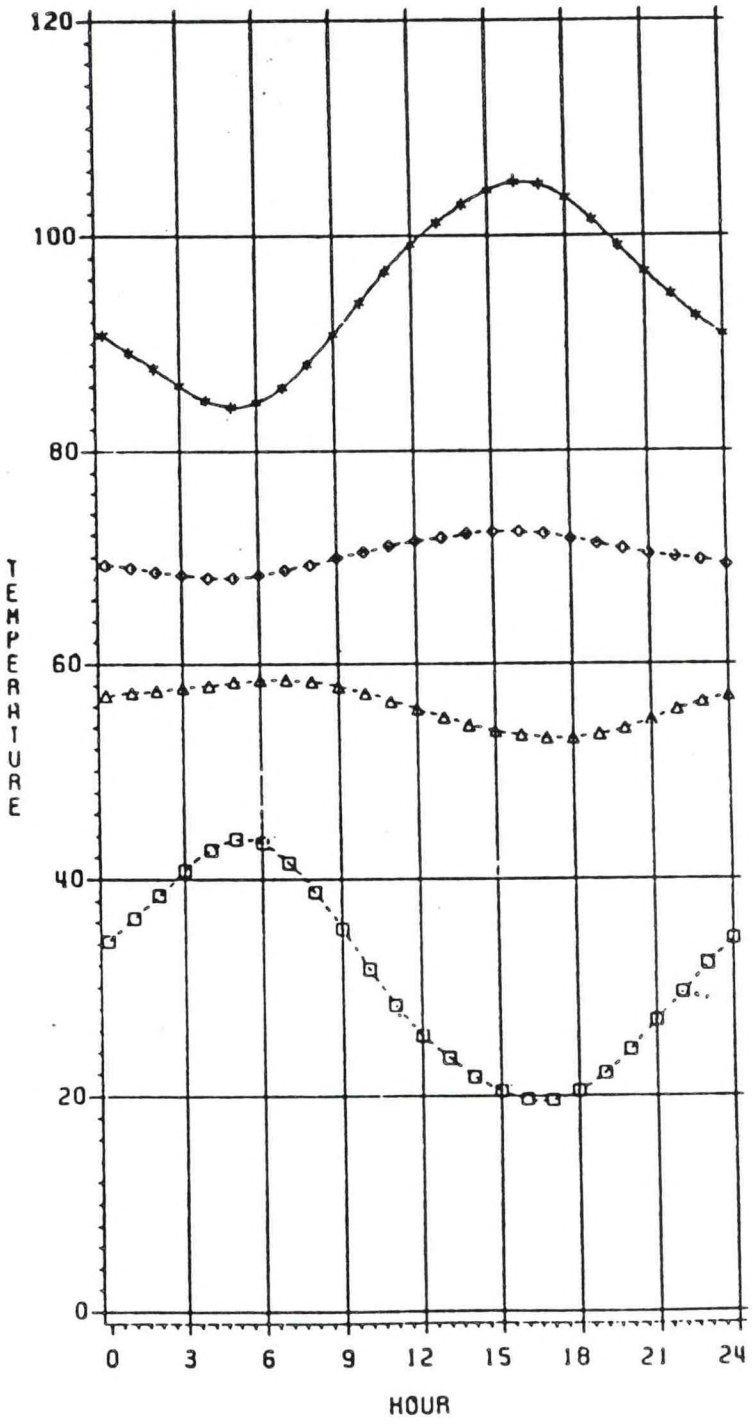
HR	TEMP	RH	WB	DP
0.	86.4	20.5	60.8	39.8
1.	84.5	21.9	60.1	39.9
2.	82.4	23.7	59.4	39.9
3.	79.9	25.9	58.6	40.2
4.	77.8	28.0	58.0	40.6
5.	76.8	28.9	57.7	40.9
6.	77.7	28.1	58.0	41.0
7.	80.1	25.9	58.8	40.8
8.	83.5	23.1	59.9	40.5
9.	87.3	20.3	61.1	40.0
10.	91.2	17.7	62.4	39.3
11.	94.6	15.5	63.4	38.6
12.	97.3	13.8	64.1	37.8
13.	99.4	12.6	64.6	37.0
14.	101.0	11.7	64.9	36.2
15.	102.3	11.0	65.1	35.5
16.	103.0	10.6	65.1	35.0
17.	102.8	10.6	64.9	34.8
18.	101.5	11.1	64.5	34.9
19.	99.4	12.0	63.9	35.4
20.	96.7	13.4	63.2	36.2
21.	93.8	15.2	62.6	37.4
22.	91.0	17.2	62.0	38.6
23.	88.5	19.0	61.4	39.5



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN JULY

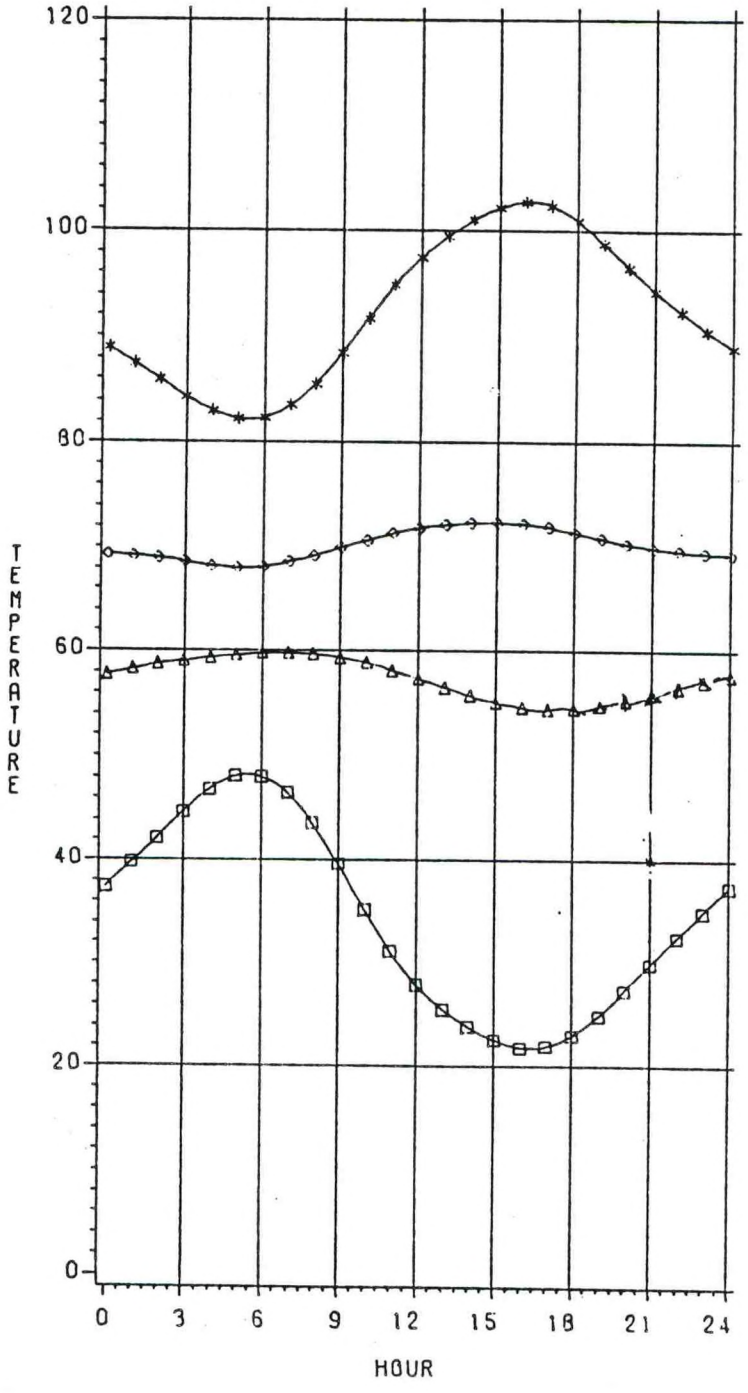
HR	TEMP	RH	WB	DP
0.	90.8	34.3	69.3	57.1
1.	89.2	36.4	69.0	57.4
2.	87.7	38.5	68.6	57.7
3.	86.1	40.8	68.3	57.9
4.	84.7	42.7	68.1	58.1
5.	84.1	43.7	68.1	58.3
6.	84.5	43.3	68.3	58.4
7.	85.9	41.5	68.8	58.5
8.	88.1	38.8	69.3	58.3
9.	90.8	35.4	69.9	57.9
10.	93.8	31.7	70.5	57.2
11.	96.7	28.3	71.0	56.5
12.	99.2	25.6	71.5	55.7
13.	101.2	23.5	71.8	55.0
14.	102.9	21.8	72.1	54.3
15.	104.2	20.5	72.3	53.7
16.	104.9	19.7	72.3	53.3
17.	104.7	19.6	72.1	53.1
18.	103.5	20.5	71.7	53.1
19.	101.5	22.1	71.2	53.4
20.	99.1	24.3	70.7	54.0
21.	96.7	26.9	70.3	54.8
22.	94.5	29.5	70.0	55.7
23.	92.5	32.1	69.7	56.5



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN AUGUST

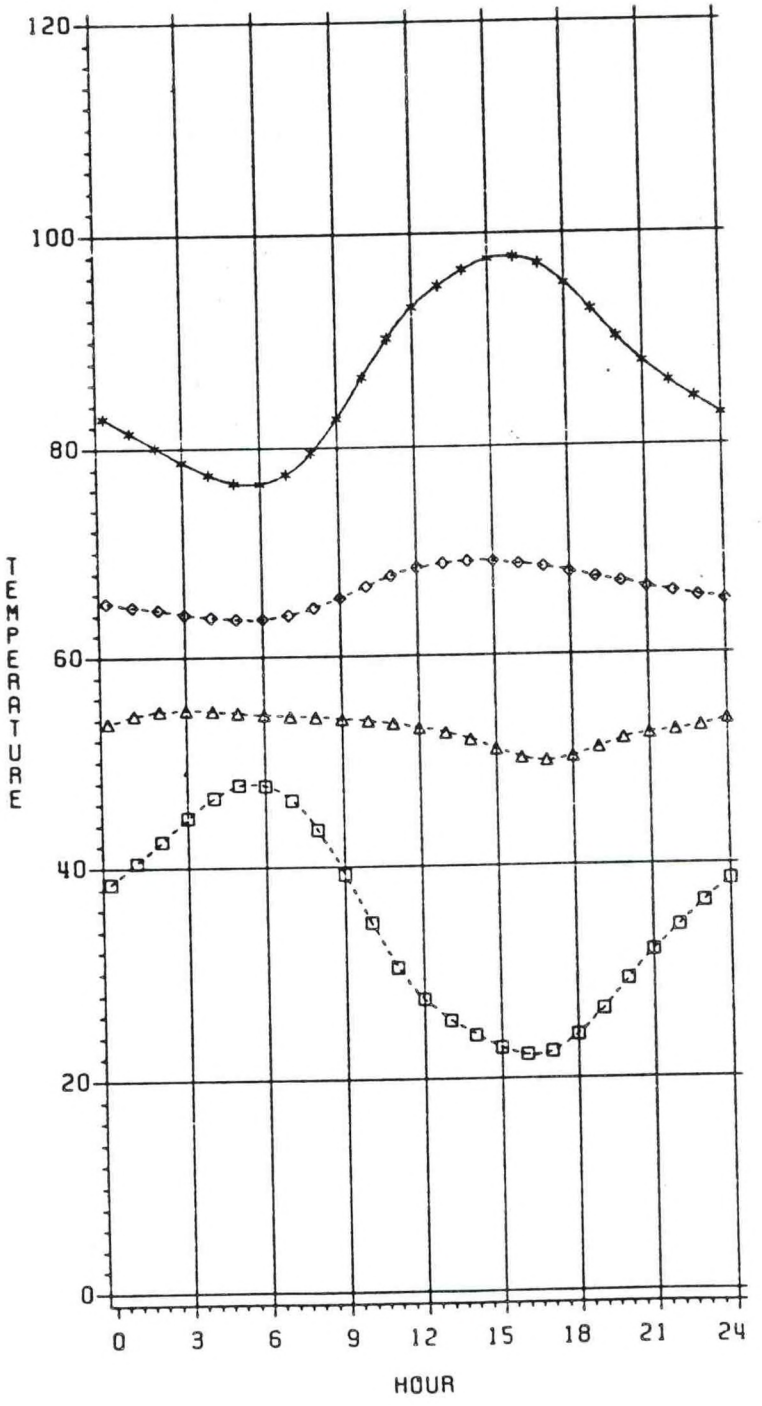
HR	TEMP	RH	WB	DP
0.	88.9	37.3	69.3	57.7
1.	87.4	39.7	69.1	58.2
2.	85.9	42.1	68.9	58.7
3.	84.3	44.6	68.5	59.0
4.	83.0	46.8	68.1	59.3
5.	82.2	48.1	67.9	59.5
6.	82.3	48.0	68.0	59.7
7.	83.5	46.5	68.5	59.7
8.	85.5	43.6	69.1	59.6
9.	88.4	39.6	69.9	59.3
10.	91.7	35.2	70.6	58.8
11.	94.8	31.1	71.3	58.1
12.	97.4	27.9	71.8	57.3
13.	99.4	25.6	72.1	56.5
14.	101.0	23.9	72.3	55.7
15.	102.1	22.6	72.3	55.1
16.	102.7	21.8	72.2	54.6
17.	102.3	21.9	71.9	54.4
18.	100.9	23.0	71.4	54.5
19.	98.8	24.9	70.8	54.8
20.	96.5	27.3	70.3	55.3
21.	94.3	29.8	69.9	55.9
22.	92.3	32.4	69.6	56.5
23.	90.5	34.9	69.4	57.1



STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN SEPTEMBER

HR	TEMP	RH	WB	DP
0.	82.9	38.5	65.2	53.7
1.	81.5	40.5	64.8	54.4
2.	80.1	42.5	64.5	54.8
3.	78.7	44.7	64.1	54.9
4.	77.5	46.6	63.8	54.8
5.	76.7	47.8	63.6	54.6
6.	76.6	47.7	63.6	54.4
7.	77.5	46.3	64.0	54.3
8.	79.5	43.5	64.6	54.2
9.	82.7	39.3	65.6	54.0
10.	86.6	34.7	66.7	53.8
11.	90.2	30.5	67.7	53.5
12.	93.1	27.5	68.4	53.1
13.	95.1	25.5	68.8	52.6
14.	96.6	24.1	69.0	51.9
15.	97.6	22.9	69.0	51.0
16.	97.8	22.2	68.7	50.2
17.	97.1	22.5	68.4	49.9
18.	95.3	24.1	67.9	50.3
19.	92.8	26.5	67.4	51.1
20.	90.2	29.3	66.9	51.9
21.	87.9	31.9	66.4	52.4
22.	86.0	34.3	65.9	52.7
23.	84.4	36.5	65.5	53.1

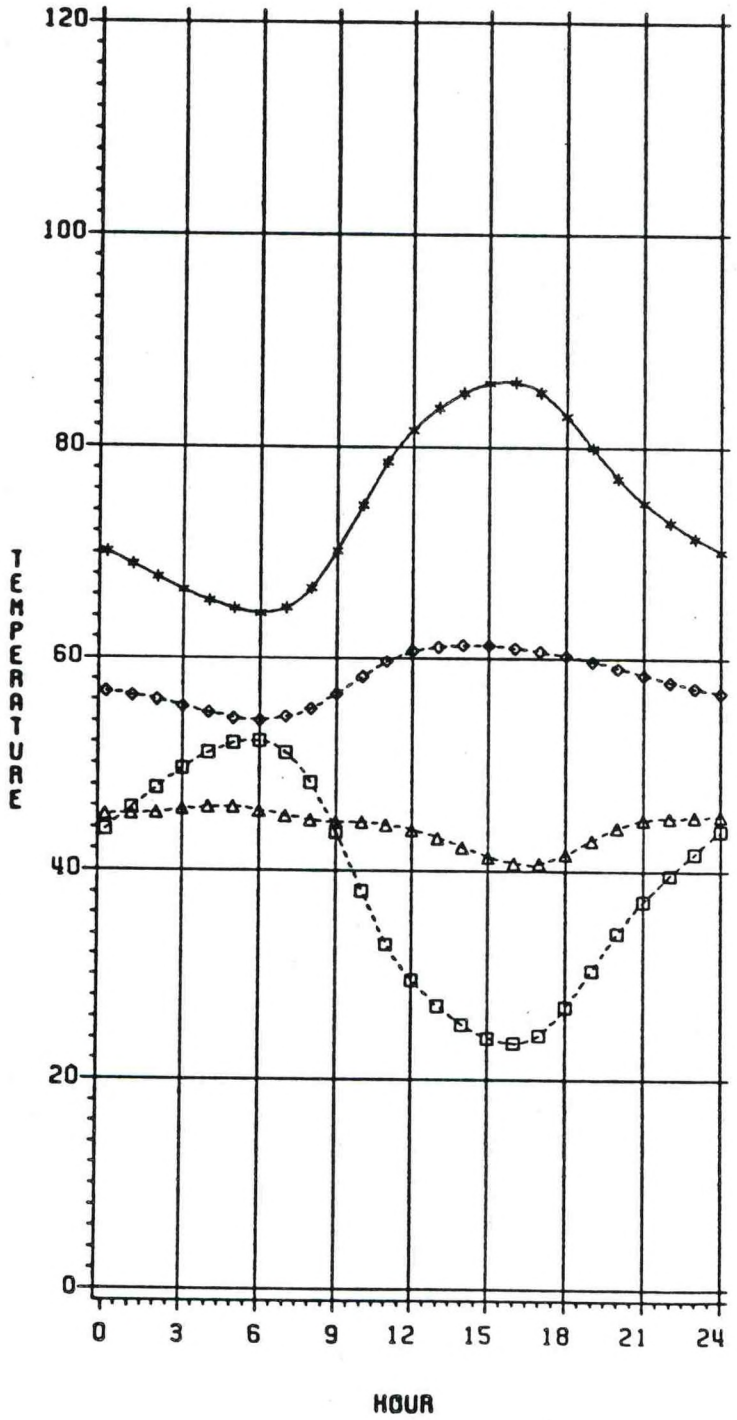


STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN OCTOBER

MONTH = 10

HR	TEMP	RH	WB	DP
0.	70.1	43.8	56.8	45.2
1.	68.9	45.8	56.4	45.3
2.	67.7	47.7	56.0	45.4
3.	66.5	49.5	55.4	45.7
4.	65.5	51.0	54.8	45.9
5.	64.7	51.9	54.3	45.9
6.	64.3	52.1	54.1	45.6
7.	64.8	51.0	54.4	45.1
8.	66.7	48.2	55.2	44.7
9.	70.2	43.6	56.6	44.5
10.	74.5	38.1	58.2	44.5
11.	78.6	33.0	59.7	44.3
12.	81.6	29.4	60.7	43.8
13.	83.7	27.0	61.1	43.1
14.	85.1	25.3	61.3	42.2
15.	86.0	24.0	61.3	41.3
16.	86.1	23.5	61.0	40.7
17.	85.2	24.3	60.7	40.7
18.	83.0	26.9	60.3	41.6
19.	80.0	30.4	59.7	42.9
20.	77.1	34.1	59.1	44.1
21.	74.8	37.1	58.4	44.8
22.	73.0	39.6	57.8	45.0
23.	71.5	41.7	57.2	45.1

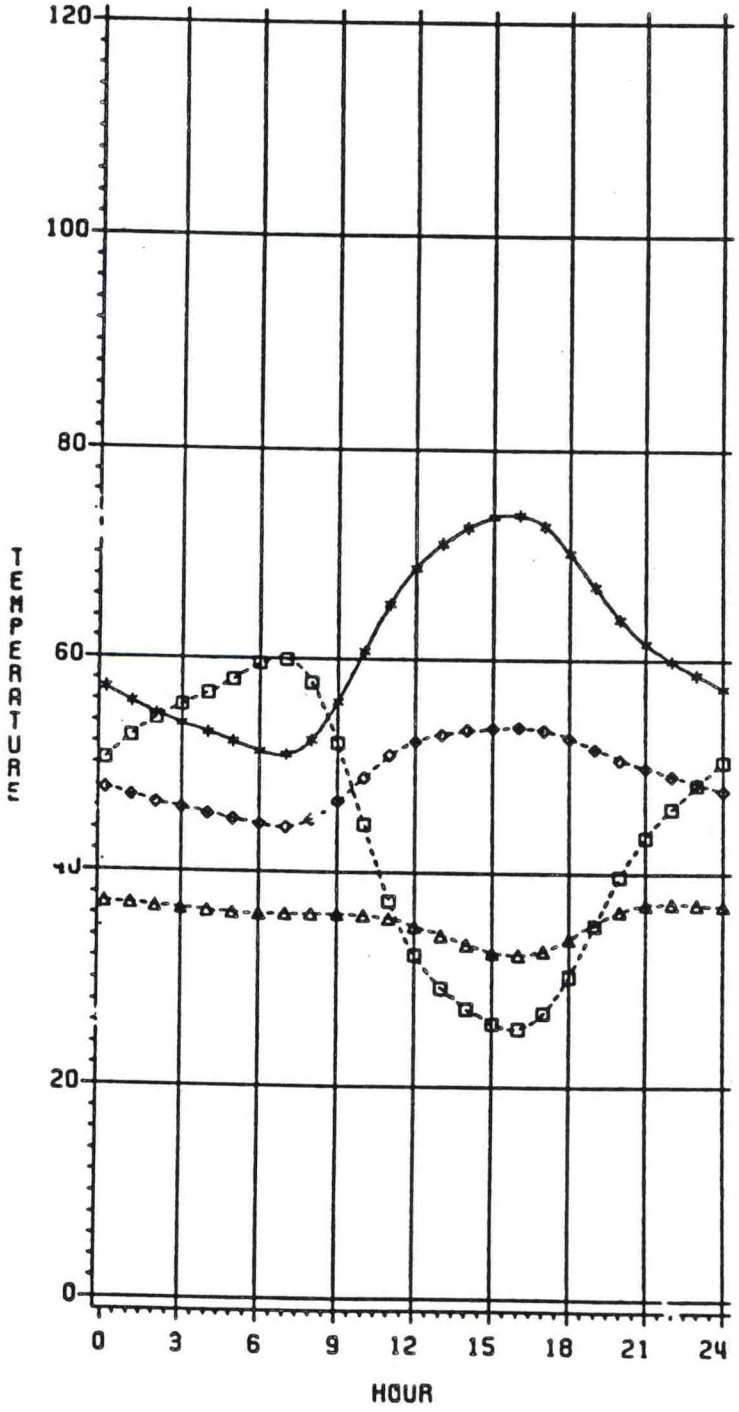


STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN NOVEMBER

MONTH = 11

HR	TEMP	RH	WB	DP
0.	57.1	50.5	47.7	37.1
1.	55.8	52.6	47.0	37.0
2.	54.7	54.3	46.4	36.8
3.	53.8	55.6	45.9	36.6
4.	53.0	56.7	45.4	36.4
5.	52.1	58.0	44.9	36.2
6.	51.2	59.5	44.4	36.1
7.	50.9	59.9	44.2	36.1
8.	52.3	57.7	44.9	36.1
9.	55.9	52.0	46.6	36.1
10.	60.7	44.4	48.8	36.0
11.	65.3	37.3	50.9	35.7
12.	68.7	32.3	52.2	35.0
13.	71.0	29.3	52.9	34.2
14.	72.5	27.3	53.3	33.3
15.	73.5	25.9	53.5	32.6
16.	73.7	25.5	53.6	32.4
17.	72.7	26.9	53.3	32.8
18.	70.2	30.4	52.6	33.9
19.	67.0	35.1	51.6	35.3
20.	63.9	39.7	50.6	36.5
21.	61.6	43.3	49.8	37.1
22.	59.9	46.0	49.1	37.2
23.	58.6	48.2	48.4	37.1

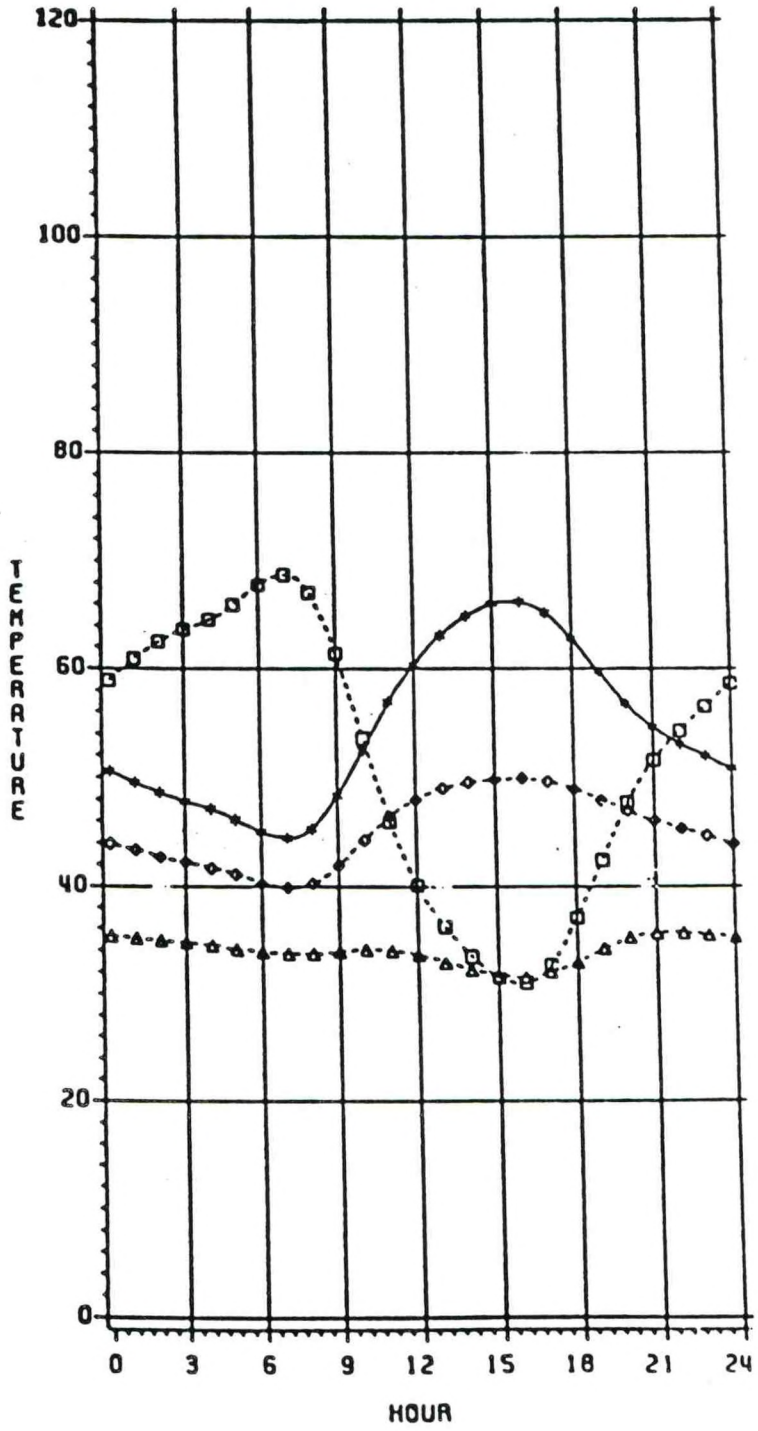


STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

AVERAGE TEMPERATURE, RELATIVE HUMIDITY, WET BULB AND DEW POINT TEMPERATURES AT PHOENIX ARIZONA IN DECEMBER

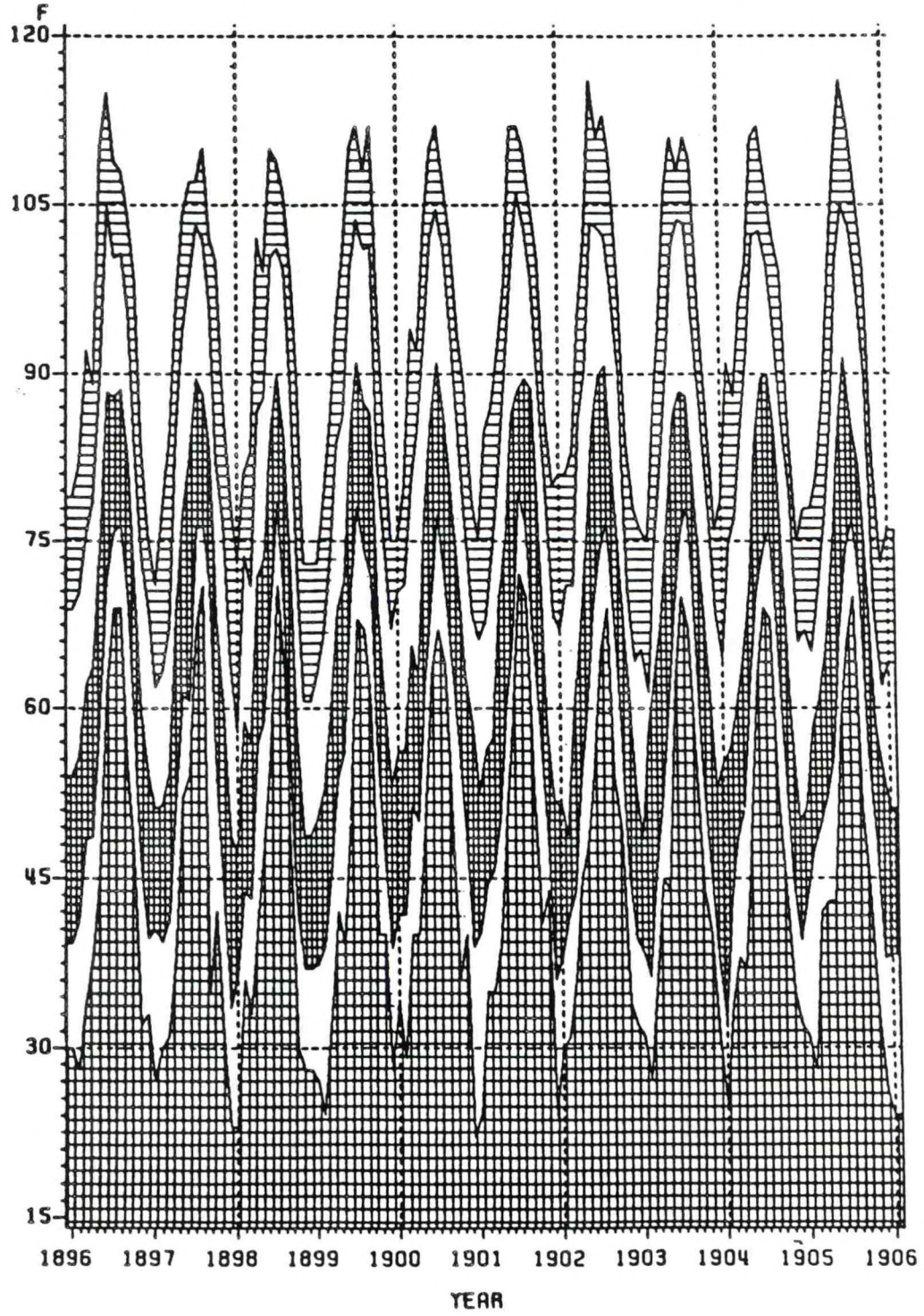
MONTH = 12

HR	TEMP	RH	WB	DP
0.	50.6	58.9	43.9	35.3
1.	49.5	60.9	43.3	35.1
2.	48.6	62.5	42.7	34.9
3.	47.8	63.6	42.2	34.7
4.	47.1	64.5	41.7	34.4
5.	46.1	65.9	41.1	34.1
6.	45.0	67.8	40.3	33.9
7.	44.4	68.7	39.9	33.7
8.	45.3	67.0	40.3	33.7
9.	48.3	61.4	41.9	33.9
10.	52.5	53.6	44.3	34.1
11.	56.9	45.9	46.5	34.0
12.	60.4	40.1	48.0	33.6
13.	63.1	36.1	49.0	32.9
14.	64.9	33.4	49.5	32.2
15.	66.0	31.5	49.8	31.7
16.	66.2	31.0	49.9	31.6
17.	65.2	32.7	49.6	32.0
18.	62.8	36.9	48.9	33.0
19.	59.7	42.4	47.9	34.2
20.	56.8	47.7	46.9	35.2
21.	54.6	51.6	46.0	35.6
22.	53.1	54.3	45.3	35.6
23.	51.9	56.5	44.6	35.4
24.	50.8	58.6	43.9	35.2

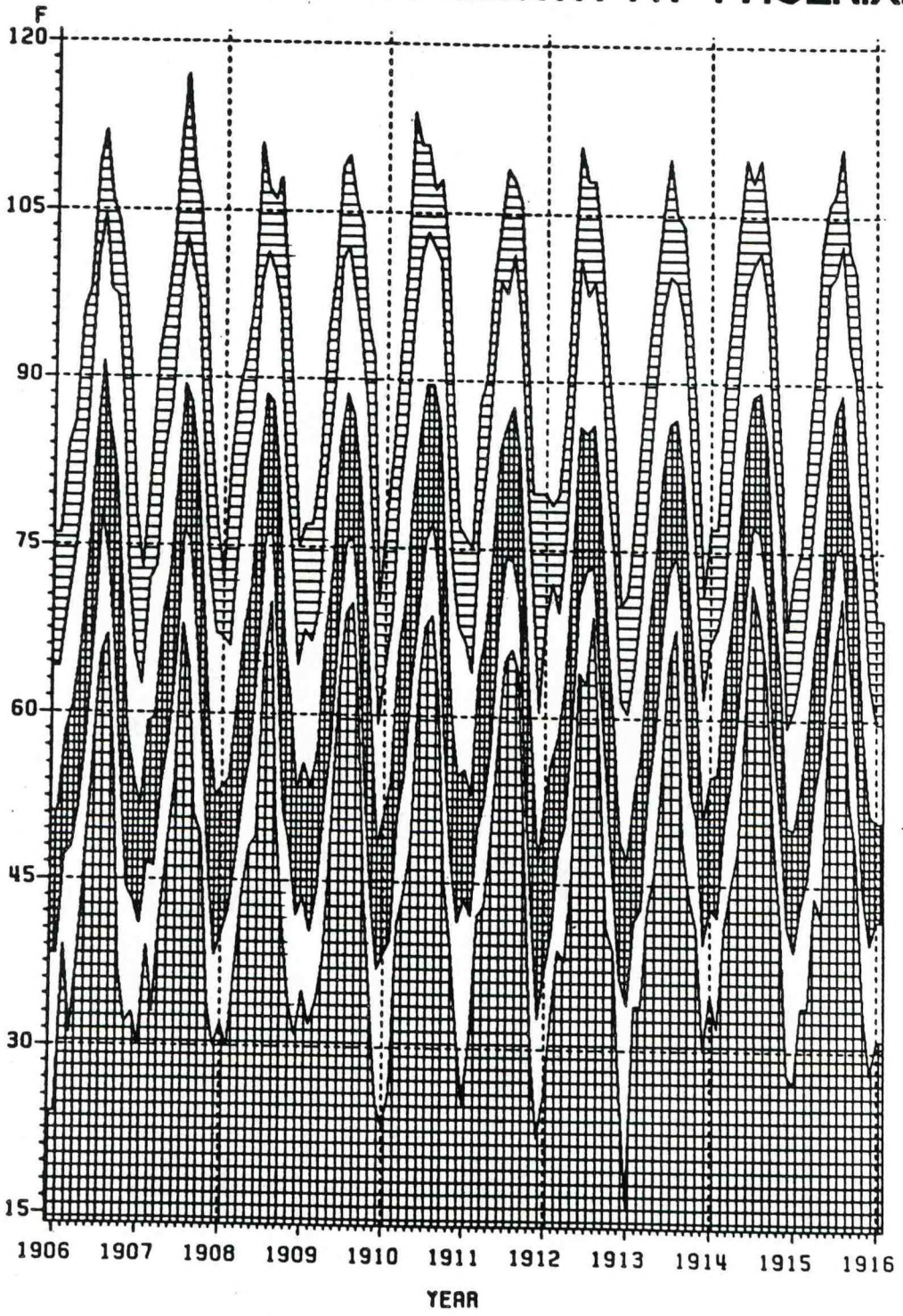


STAR IS DRY BULB TEMPERATURE (F)
SQUARE IS RELATIVE HUMIDITY (%)
DIAMOND IS WET BULB TEMPERATURE (F)
TRIANGLE IS DEW POINT TEMPERATURE (F)
DATA BASE IS 1971 - 1985

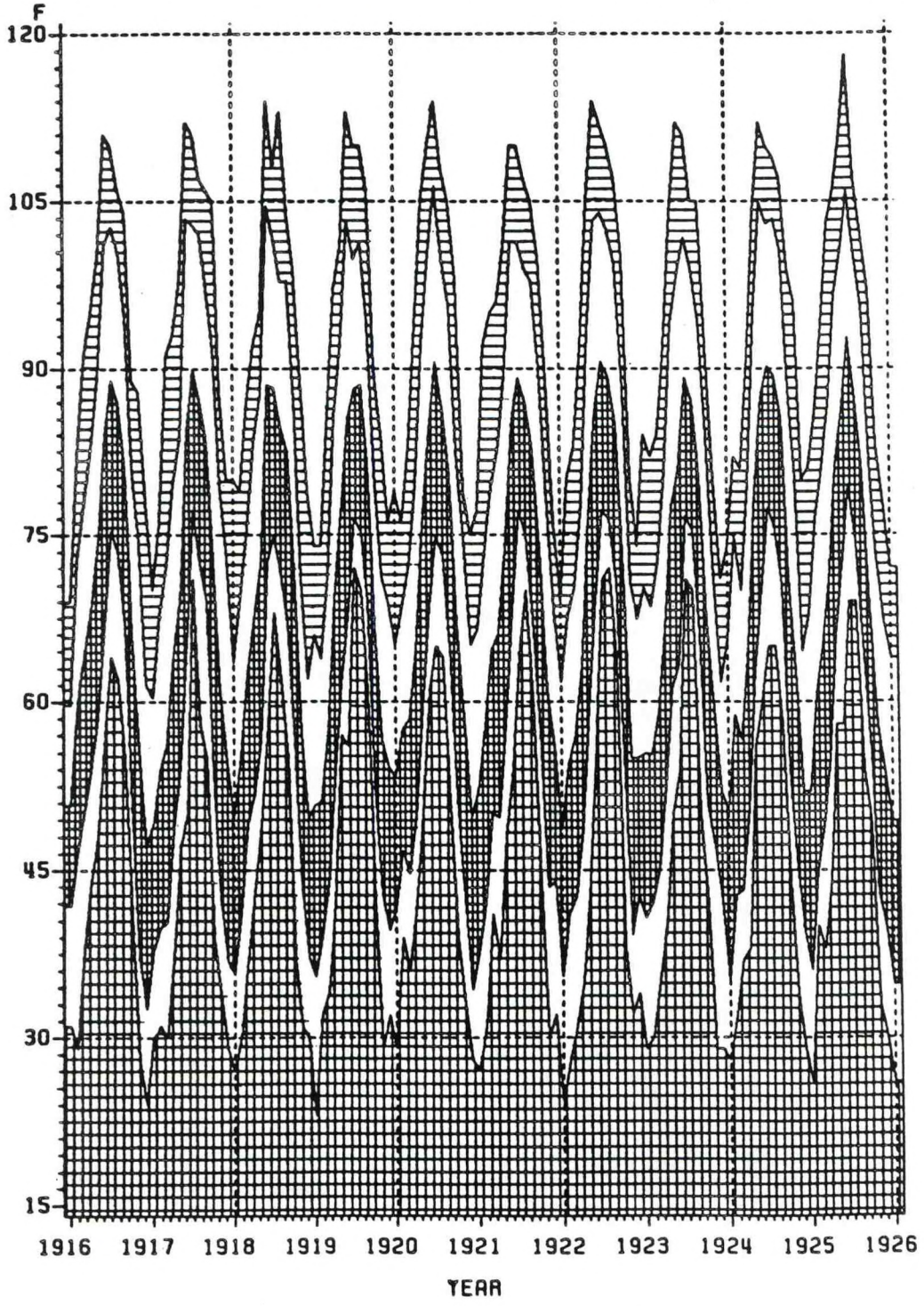
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



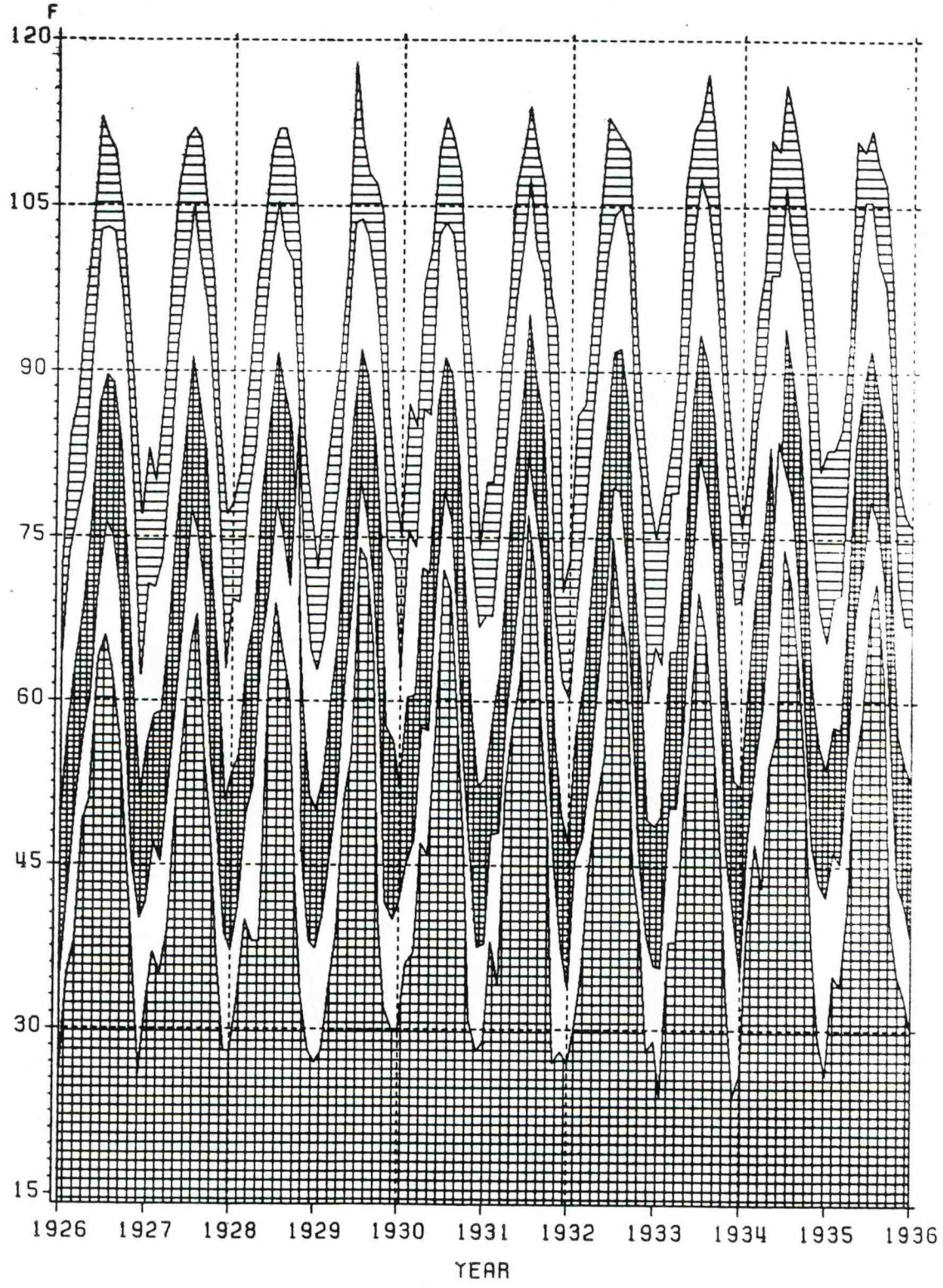
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



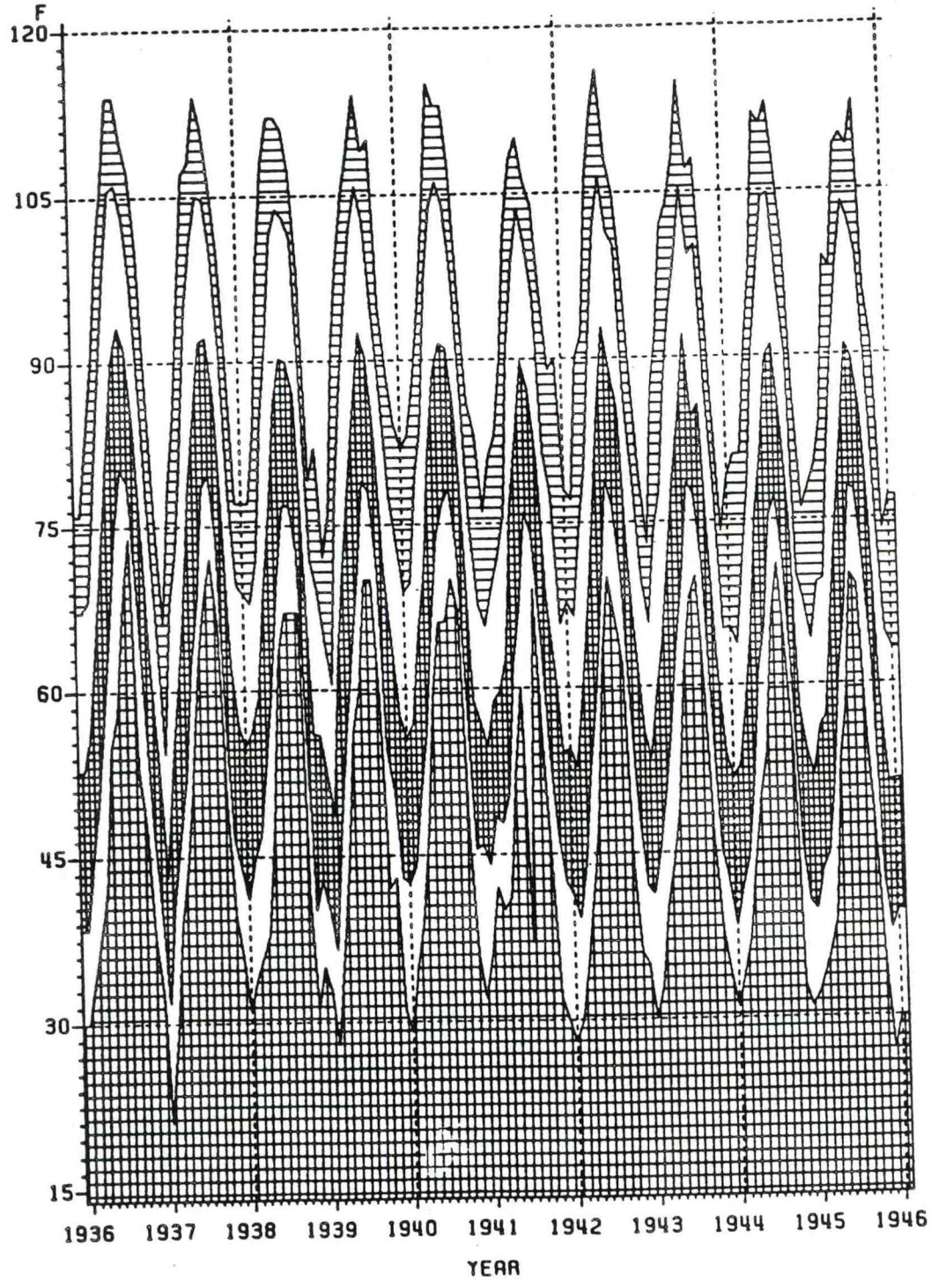
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



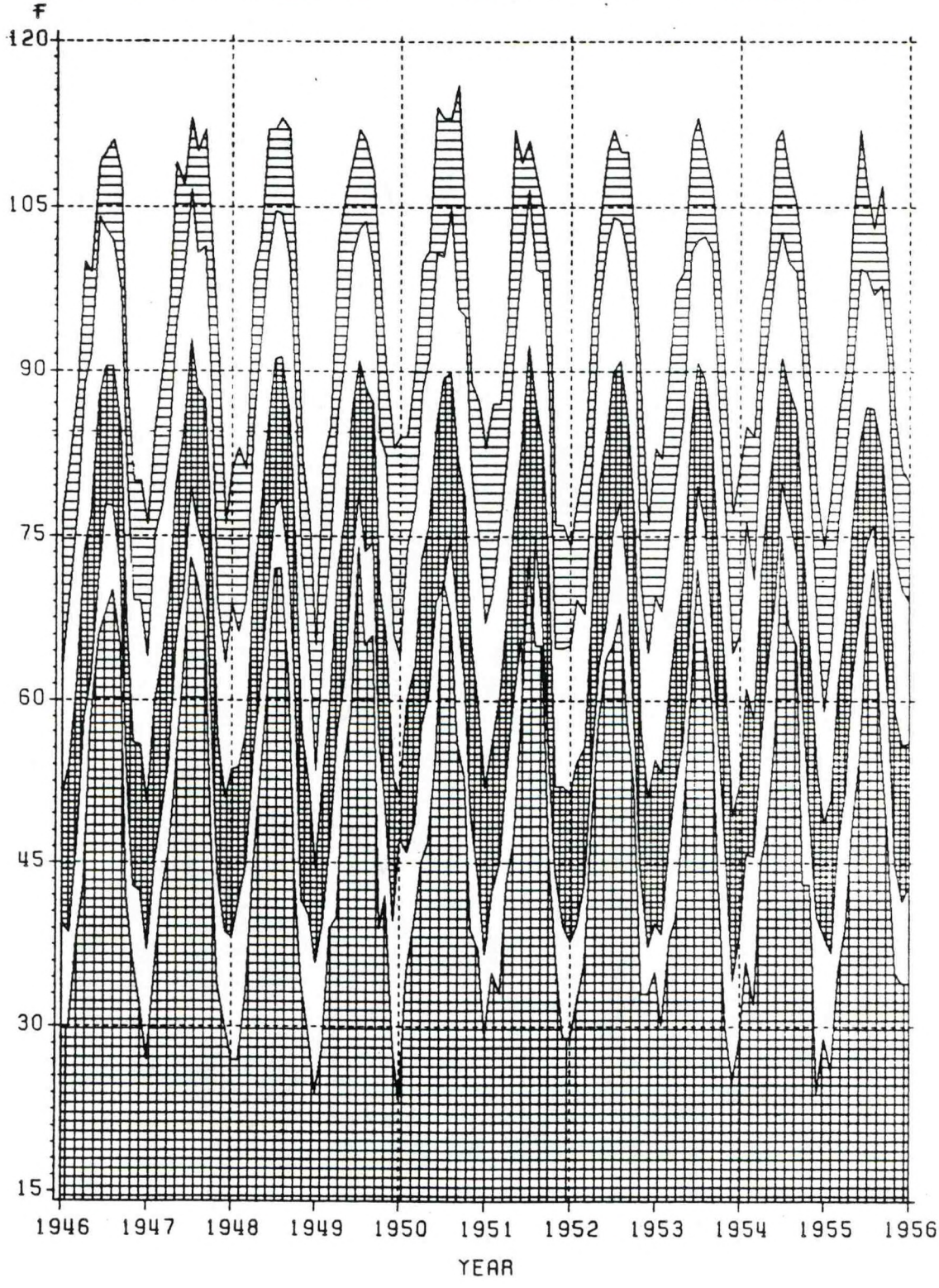
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



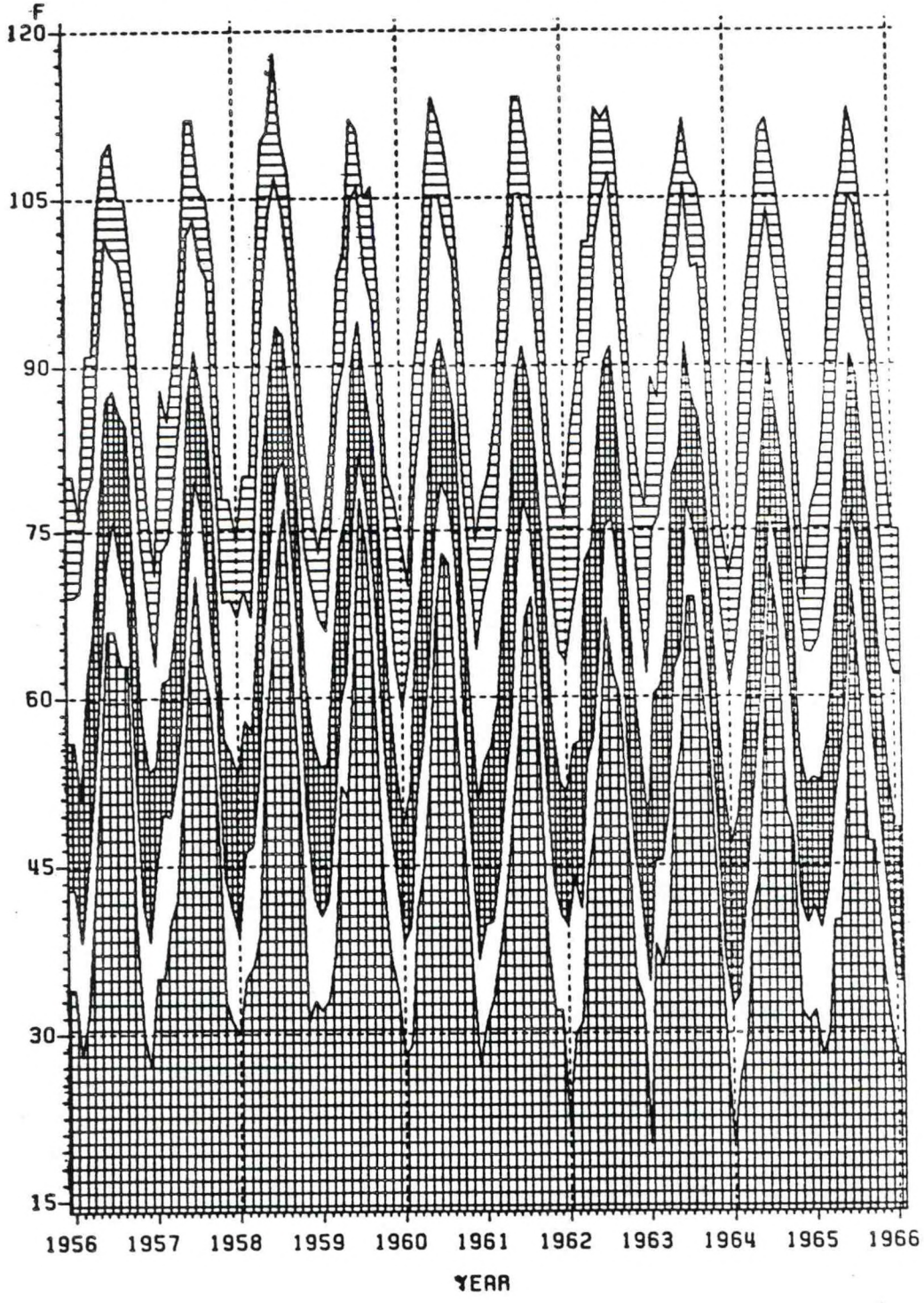
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



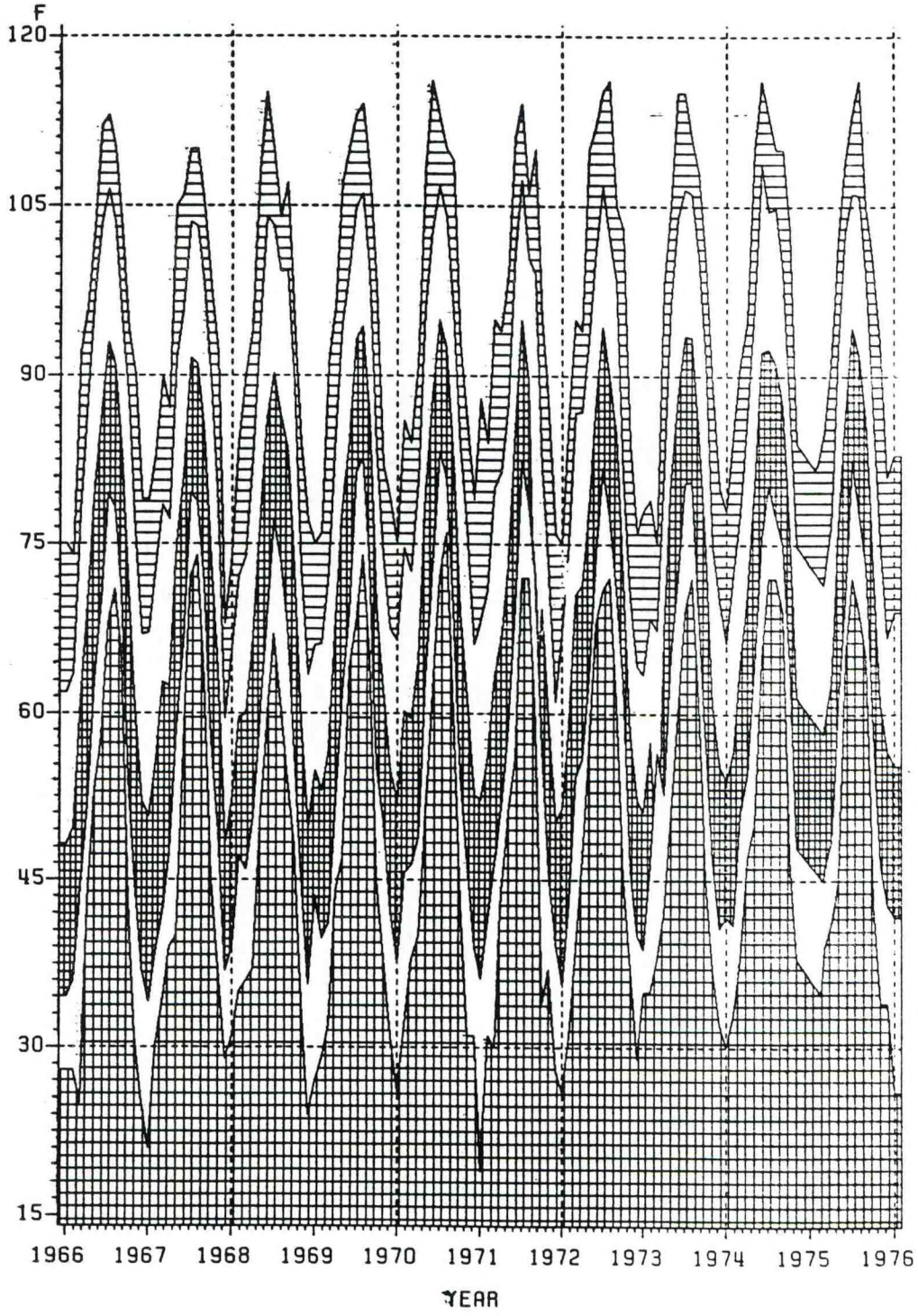
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



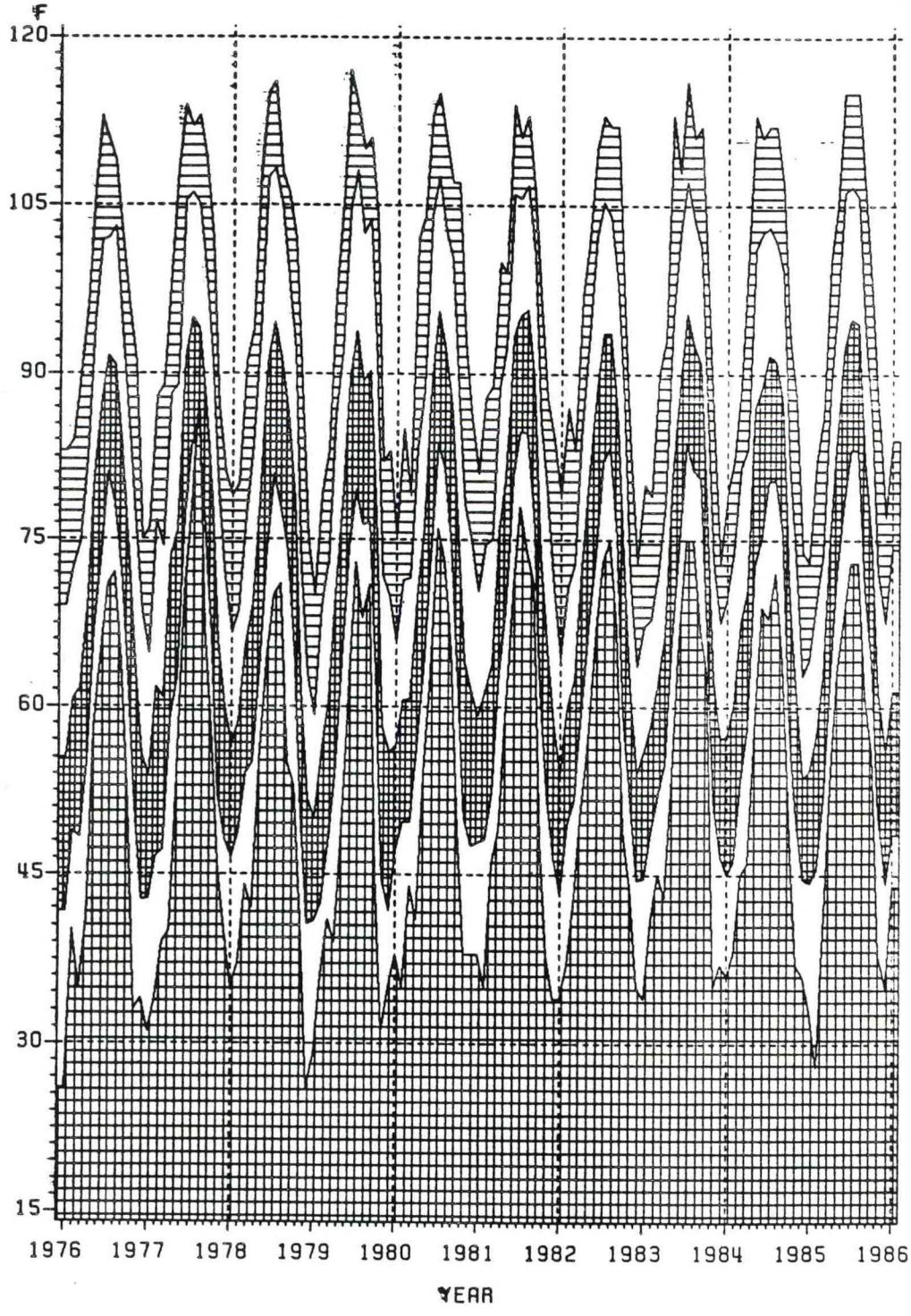
EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



EXTREME MAXIMUM, AVERAGE MAXIMUM, MEAN, AVERAGE MINIMUM, AND EXTREME MINIMUM TEMPERATURES BY MONTH AT PHOENIX.



Temperature

DAYS WITH 100 DEGREES OR HIGHER 1896-1985

The date of the occurrence of the first 100 degree temperature in the spring and the last in the fall has always been of primary interest to the public.

The average number of days per year with a maximum temperature of 100 degrees or higher is 86.8. These days are distributed throughout the year as follows:

April	May	June	July	August	September	October
0.2	4.8	19.7	25.9	22.7	12.6	0.9

The least number of such days was 48 in 1913.
The greatest number of such days was 116 in 1973 and 1978.

The greatest number of consecutive days with maximum temperature of 100 degrees or higher was 61 from June 2 through August 1, 1935.

SPRING

Earliest Date of Frist Occurrence of 100 or Higher:

April 14, 1925; 1962; 1985

Average Date of First Occurrence of 100 or Higher:

May 16

Latest Date of First Occurrence of 100 or Higher:

June 18, 1913

FALL

Earliest Date of Last Occurrence of 100 or Higher:

September 2, 1904

Average Date of Last Occurrence of 100 or Higher:

September 27

Latest Date of Last Occurrence of 100 or Higher:

October 20, 1921

Temperature

DAYS WITH 110 DEGREES OR HIGHER 1896-1985

Most residents of Phoenix put up with temperatures below 110 without grumbling. However, when the mercury climbs to 110 or higher, even the old-timers feel the heat and begin to complain.

The average number of days per year with a maximum temperature of 110 degrees or higher is 9.0. These days are distributed throughout the year as follows:

May	June	July	August	September
0.1	3.0	4.1	1.5	0.3

The least number of such days was 0 in 1911.
The greatest number of such days was 28 in 1979.

The greatest number of consecutive days with maximum temperature of 110 degrees or higher was 18 from June 12 through June 29, 1974.

SPRING

Earliest Date of First Occurrence of 110 or Higher:

May 10, 1934

Average Date of First Occurrence of 110 or Higher:

June 22

Latest Date of First Occurrence of 110 or Higher:

August 9, 1915

FALL

Earliest Date of Last Occurrence of 110 or Higher:

June 5, 1912

Average Date of Last occurrence of 110 or Higher:

August 7

Latest Date of Last Occurrence of 110 or Higher:

September 12, 1971

Temperature

PROBABILITY IN PERCENT OF OBSERVING 100 OR HIGHER, 105 OR HIGHER AND 110 OR HIGHER 1896-1985

PROBABILITY (PERCENT)	FIRST OCCURRENCE IN SPRING BY GIVEN DATE			LAST OCCURRENCE IN FALL BY GIVEN DATE		
	100 OR HIGHER	105 OR HIGHER	110 OR HIGHER	100 OR HIGHER	105 OR HIGHER	110 OR HIGHER
90	JUN 6	JUN 21	JUL 8	SEP 12	AUG 20	JUL 11
80	MAY 28	JUN 17	JUL 1	SEP 18	AUG 23	JUL 18
70	MAY 24	JUN 13	JUN 29	SEP 21	SEP 1	JUL 26
60	MAY 19	JUN 10	JUN 27	SEP 24	SEP 6	AUG 1
50	MAY 16	JUN 7	JUN 22	SEP 27	SEP 10	AUG 7
40	MAY 13	JUN 3	JUN 20	SEP 28	SEP 14	AUG 10
30	MAY 10	MAY 30	JUN 15	SEP 30	SEP 16	AUG 19
20	MAY 6	MAY 25	JUN 11	OCT 5	SEP 19	AUG 26
10	APR 20	MAY 16	JUN 4	OCT 9	SEP 23	SEP 3

Examples: There is a 40 percent probability that the first 100 degree temperature or higher will occur as early as May 13.

There is a 30 percent probability that the last 110 degree temperature or higher will occur as late as August 19.

The 50 percent level also gives the average date of the first occurrence in spring and the average date of the last occurrence in fall.

Temperature

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 115 OR HIGHER
1896-1985

4 days	June	19-22	1968	115	115	115	115
4 days	June	25-28	1979	115	116	116	117
3 days	July	5-7	1905	115	116	115	
3 days	July	9-11	1958	116	115	118	
3 days	June	14-16	1974	115	115	115	

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 110 OR HIGHER
1896-1985

18 days	June	12-29	1974
9 days	June	27-July 5	1907
9 days	July	3-11	1940
9 days	June	17-25	1978
9 days	June	18-26	1981
8 days	June	11-18	1896
8 days	July	5-12	1901
8 days	July	7-14	1958
8 days	July	13-20	1978

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 105 OR HIGHER
1896-1985

28 days	June	10-July 7	1936
27 days	June	10-July 6	1974
25 days	June	23-July 17	1958
22 days	June	20-July 11	1973

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 100 OR HIGHER
1896-1985

61 days	June	2-August 1	1935
49 days	June	30-August 17	1966
47 days	June	11-July 11	1951

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 99 OR HIGHER
1896-1985

98 days	June	17-September 22	1973
74 days	June	29-September 10	1978
68 days	June	11-August 17	1966
68 days	June	7-August 13	1980

Temperature

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 75 OR LOWER
1896-1985

120 days	November 16	1963-March 14	1964
107 days	November 27	1914-March 13	1915
105 days	November 11	1931-February 23	1932

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 60 OR LOWER
1896-1985

18 days	January 10-27	1898
18 days	January 17-February 3	1933
17 days	January 23-February 8	1949

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 55 OR LOWER
1896-1985

9 days	January 17-25	1937
9 days	January 23-31	1949
8 days	January 20-27	1898
8 days	February 2-9	1903

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 50 OR LOWER
1896-1985

5 days	January 20-24	1937
5 days	December 13-17	1967
5 days	January 3-7	1971
4 days	January 11-14	1898
4 days	February 5-8	1903
4 days	January 24-27	1949

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 45 OR LOWER
1896-1985

3 days	January 5-7	1913
3 days	January 21-23	1937
2 days	January 3-4	1949

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MAXIMUM 42 OR LOWER
1896-1985

3 days	January 5-7	1913	42	39	41

Temperature

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 90 OR HIGHER
1896-1985

188 days 1934	177 days 1952
186 days 1972	176 days 1936
180 days 1974	176 days 1979
179 days 1954	172 days 1981
178 days 1950	

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 100 OR HIGHER
1896-1985

116 days 1973	109 days 1979
116 days 1978	107 days 1974
111 days 1975	107 days 1980
110 days 1958	107 days 1981
109 days 1984	107 days 1983

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 105 OR HIGHER
1896-1985

75 days 1978	67 days 1933
73 days 1979	67 days 1974
70 days 1981	66 days 1932
70 days 1983	66 days 1973
68 days 1977	

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 110 OR HIGHER
1896-1985

28 days 1979	25 days 1981
27 days 1936	21 days 1983
27 days 1974	19 days 1940
27 days 1985	19 days 1973
25 days 1978	18 days 1961
	18 days 1986

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 115 OR HIGHER
1896-1985

7 days 1974	3 days 1905
5 days 1979	3 days 1934
5 days 1985	3 days 1958
4 days 1968	

Temperature

LEAST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 90 OR HIGHER
1896-1985

127 days 1912	137 days 1941
131 days 1907	137 days 1957
131 days 1908	138 days 1896
131 days 1913	139 days 1899
136 days 1911	141 days 1903

LEAST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 100 OR HIGHER
1896-1985

48 days 1913	60 days 1955
53 days 1912	62 days 1908
55 days 1909	64 days 1915
59 days 1911	65 days 1907

LEAST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 105 OR HIGHER
1896-1985

10 days 1913	17 days 1956
12 days 1911	19 days 1912
13 days 1914	19 days 1915
15 days 1909	20 days 1923
16 days 1955	21 days 1908

LEAST NUMBER OF DAYS IN ONE YEAR WITH MAXIMUM 110 OR HIGHER
1896-1985

0 days 1911	2 days 1904
1 day 1897	2 days 1906
1 day 1908	2 days 1912
1 day 1909	2 days 1914
1 day 1941	2 days 1916
1 day 1956	

Temperature

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 35 OR LOWER
1896-1985

20 days December 7-26	1916
17 days January 11-27	1963
17 days December 25-January 10	1967
15 days January 14-28	1937
13 days January 3-15	1971
13 days January 6-18	1964

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 32 OR LOWER
1896-1985

14 days December 22-January 4	1912
14 days December 8-21	1916
12 days December 27-January 7	1967
11 days January 21-31	1904
11 days January 18-28	1937
10 days January 9-18	1964

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 30 OR LOWER
1896-1985

12 days December 8-19	1916
12 days December 27-January 7	1967
8 days January 21-28	1937
7 days January 12-18	1963
7 days January 4-10	1971

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 28 OR LOWER
1896-1985

6 days January 4-9	1971
5 days December 30-January 3	1912
5 days January 22-26	1937
5 days January 12-16	1963

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 25 OR LOWER
1896-1985

4 days January 5-8	1971
4 days January 9-12	1964
3 days January 6-8	1913
3 days January 22-24	1937
3 days January 13-15	1963

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 20 OR LOWER
1896-1985

3 days January 6-8 1913	17 16 19
2 days January 7-8 1971	19 20

Temperature

GREATEST NUMBER OF DAYS IN ONE WINTER WITH MINIMUM 32 OR LOWER
1896-1985

39 days 1963-1964	21 days 1965-1966
30 days 1897-1898	18 days 1912-1913
29 days 1916-1917	16 days 1936-1937
24 days 1911-1912	16 days 1971-1972
24 days 1966-1967	14 days 1968-1969
21 days 1903-1904	12 days 1970-1971

GREATEST NUMBER OF DAYS IN ONE WINTER WITH MINIMUM 28 OR LOWER
1896-1985

15 days 1963-1964	8 days 1966-1967
10 days 1897-1898	7 days 1962-1963
9 days 1911-1912	6 days 1903-1904
9 days 1936-1937	6 days 1970-1971
8 days 1916-1917	5 days 1912-1913

GREATEST NUMBER OF DAYS IN ONE WINTER WITH MINIMUM 24 OR LOWER
1896-1985

5 days 1963-1964	3 days 1912-1913
4 days 1897-1898	3 days 1936-1937
4 days 1911-1912	3 days 1962-1963
4 days 1970-1971	2 days 1916-1917

GREATEST NUMBER OF DAYS IN ONE WINTER WITH MINIMUM 20 OR LOWER
1896-1985

3 days 1912-1913	1 day 1962-1963
2 days 1970-1971	1 day 1963-1964

LEAST NUMBER OF DAYS IN ONE WINTER WITH MINIMUM 32 OR LOWER
1896-1985

0 days 1980-1981	1 day 1937-1938
0 days 1981-1982	1 day 1940-1941
0 days 1982-1983	1 day 1942-1943
0 days 1983-1984	1 day 1952-1953
0 days 1977-1978	

Temperature

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 85 OR HIGHER
1896-1985

10 days August 28-September 6	1983
10 days July 5-14	1985
8 days July 31-August 7	1986
7 days July 2-8	1973
7 days July 28-August 3	1977
7 days July 27-August 2	1980
7 days August 24-30	1985
6 days July 14-19	1970
6 days July 25-30	1971
6 days July 27-August 1	1972

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MINIMUM 80 OR HIGHER
1896-1985

40 days July 7-August 15	1977
28 days July 16-August 12	1980
27 days July 28-August 23	1986
25 days July 20-August 13	1985
19 days July 23-August 10	1982
17 days June 26-July 12	1984
16 days July 6-21	1983
15 days August 10-24	1973

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MINIMUM 85 OR HIGHER
1896-1985

51 days 1981	19 days 1970
35 days 1983	18 days 1969
33 days 1977	17 days 1984
27 days 1982	14 days 1971
26 days 1986	13 days 1936
23 days 1980	12 days 1979
23 days 1985	

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MINIMUM 80 OR HIGHER
1896-1985

87 days 1981	57 days 1982
76 days 1977	54 days 1969
76 days 1985	54 days 1984
71 days 1983	52 days 1933
67 days 1986	49 days 1980
60 days 1958	46 days 1971
60 days 1970	

Temperature

GREATEST NUMBER OF CONSECUTIVE DAYS WITH MEAN 100 OR HIGHER
1896-1985

4 days July 29-August 1 1972:	102, 100, 101, 103
4 days July 2-5 1973:	101, 100, 102, 100
3 days July 15-17 1936:	101, 100, 102
3 days August 3-5 1969:	100, 100, 101

GREATEST NUMBER OF DAYS IN ONE YEAR WITH MEAN 100 OR HIGHER
1896-1985

7 days 1985	4 days 1970
5 days 1969	4 days 1972
5 days 1973	3 days 1936
5 days 1980	3 days 1974
5 days 1985	3 days 1969
5 days 1986	

HIGHEST DAILY MEAN
1896-1985

103 July 6 1983:	max 114, min 92
103 August 1 1972:	max 116, min 90
103 July 8 1985:	max 115, min 91

LOWEST DAILY MEAN
1896-1985

28 January 6 1913:	max 39, min 17
28 January 7 1913:	max 41, min 16
33 January 22 1937:	max 45, min 21
33 January 13 1963:	max 45, min 20
33 January 7 1971:	max 46, min 19

GREATEST DAILY TEMPERATURE RANGE
1896-1985

48 June 13 1917:	max 107, min 59
48 April 17 1919:	max 96, min 48

LEAST DAILY TEMPERATURE RANGE
1896-1985

3 December 10 1898:	max 36, min 33
3 November 26 1905:	max 60, min 57
3 October 24 1919:	max 62, min 59
3 February 3 1983:	max 52, min 49
3 November 25 1985:	max 61, min 58

Temperature

NORMAL AND HIGHEST AND LOWEST HEATING DEGREE DAYS BY MONTHS AND YEAR OF OCCURRENCE
(Base 65 Degrees)

	NORMAL 1951-1980	HIGHEST 1899-1985	YEAR	LOWEST 1899-1985	YEAR
July	0	0	all	0	all
August	0	0	all	0	all
September	0	4	1965	0	most
October	13	88	1908	0	several
November	159	293	1922	39	1954
December	368	573	1911	122	1980
January	394	681	1937	110	1986
February	269	458	1939	114	1954
March	187	288	1952	6	1934
April	52	133	1965	0	1931, 1959
May	0	55	1915	0	many
June	0	0	all	0	all
Season	1442	2062	1916-1917	636	1980-1981

A "heating degree day" is equal to 65 degrees Fahrenheit minus the average temperature for the day with negative differences being counted as zero. The heating degree day is used by utility companies to determine heating requirements. It is also used to help plan insulation protection and to determine the size of heating plants needed. Industry has found that a temperature of 72 degrees Fahrenheit is too high a base for these computations, since in every building there is a certain amount of heat generated by appliances, electric lights, human bodies, etc. The accumulation of "heating degree days" begins on July 1.

Examples: If the average (mean) temperature for the day was 54, there would be 11 heating degree days for that day. If the average is 65 or higher, there would be 0 heating degree days for that day.

Temperature

NORMAL AND HIGHEST AND LOWEST COOLING DEGREE DAYS BY MONTHS AND YEAR OF OCCURRENCE
(Base 65 Degrees)

	NORMAL 1951-1980	HIGHEST 1969-1985	YEAR	LOWEST 1969-1985	YEAR
January	0	7	1971	0	most
February	20	52	1986	0	several
March	51	209	1986	0	1973
April	142	345	1981	42	1975
May	376	688	1984	265	1971
June	645	857	1981	582	1969
July	846	956	1980	833	1976
August	772	961	1981	763	1979
September	588	787	1983	525	1985
October	273	434	1977	151	1970
November	27	95	1981	4	1972
December	6	13	1980	0	most
Annual	3746	4784	1981	3651	1971

Cooling degree days on the base of 65 were first started nationally in 1969. Cooling degree days on the base of 80 have been used in Phoenix since 1951.

A "cooling degree day" is equal to the average temperature for the day minus 65 degrees Fahrenheit with negative differences being counted as zero. The cooling degree day is used by utility companies to determine cooling requirements. It is also used to help plan insulation protection and to determine the size of refrigeration plants needed. The accumulation of "cooling degree days begins on January 1.

Example: If the average (mean) temperature for the day was 94, there would be 29 cooling degree days for that day. If the average is 65 or lower, there would be 0 cooling degree days for that day.

Temperature

AVERAGE AND HIGHEST AND LOWEST COOLING DEGREE DAYS BY MONTHS AND YEAR OF OCCURRENCE
(Base 80 Degree)

	AVERAGE 1951-1980	HIGHEST 1951-1985	YEAR	LOWEST 1951-1985	YEAR
January	0	0	all	0	all
February	0	0	all	0	all
March	0	7	1986	0	most
April	1	31	1981	0	most
May	41	238	1984	3	1957
June	219	407	1981	41	1965
July	390	491	1980	222	1955
August	319	496	1981	183	1956
September	166	348	1983	65	1961 1964
October	18	82	1978 1980	0	several
November	0	0	all	0	all
December	0	0	all	0	all
Annual	1154	2055	1981	737	1964

A "cooling degree day" is equal to the average temperature for the day minus 80 degrees Fahrenheit with negative differences being counted as zero. The cooling degree day is used by utility companies to determine cooling requirements. It is also used to help plan insulation protection and to determine the size of refrigeration plants needed. The accumulation of "cooling degree days" begins on January 1.

Example: If the average (mean) temperature for the day was 94, there would be 14 cooling degree days for that day. If the average is 80 or lower, there would be 0 cooling degree days for that day.

Temperature

FREEZE AND GROWING SEASON DATA

MEAN DATES OF LAST 32 DEGREES IN SPRING AND FIRST 32 DEGREES IN FALL IN THE GREATER PHOENIX AREA

STATION	LAST	LENGTH OF GROWING SEASON (DAYS)	FIRST
Alhambra 2 NE	March 10	258	November 23
Buckeye	March 6	260	November 21
Camelback	March 8	260	November 23
Deer Valley	March 7	263	November 25
Falcon Field-Mesa	April 3	234	November 23
Laveen	February 21	279	November 27
Litchfield Park	February 26	270	November 23
Marienette	February 25	271	November 23
Mesa Experiment Station	March 3	266	November 24
Phoenix Sky Harbor	February 7	309	December 12
Tempe	March 2	265	November 22
Tempe Citrus Station	March 14	253	November 22

PROBABILITY OF LOW TEMPERATURES

Spring

STATION	TEMP	90%	75%	50%	25%	10%
Litchfield Park	40	MAR 22	MAR 30	APR 8	APR 17	APR 25
	36	MAR 3	MAR 13	MAR 25	APR 6	APR 16
	32	FEB 1	FEB 13	FEB 26	MAR 11	MAR 23
	28	DEC 29	JAN 14	FEB 3	FEB 23	MAR 12
	24				JAN 25	FEB 12
	20					

FALL

	10%	25%	50%	75%	90%
40	OCT 21	OCT 27	NOV 3	NOV 10	NOV 16
36	OCT 29	NOV 6	NOV 15	NOV 24	DEC 2
32	NOV 4	NOV 13	NOV 23	DEC 3	DEC 12
28	NOV 16	NOV 28	DEC 11	DEC 24	JAN 5
24	DEC 20	JAN 4			
20					

ARIZONA INDIAN PROVERB: "When small water snakes leave the sand in low damp lands, frosts may be expected in three days".

Temperature

In these probability of low temperature tables, the 50% level gives the "mean" or "average" as well as the "median" of occurrence of each threshold. Another way of expressing the same result is to state that, on the average, the first temperature as low as 40 degrees at Litchfield Park will occur by November 3 in one half of the years (or, for example, in 5 years out of 10).

By the same line of reasoning, there is a 90% probability that the first temperature as low as 40 degrees will occur by November 16. Again, it can be stated that 40 degrees will occur by November 16 in 9 years out of 10, in the long run.

PROBABILITY OF LOW TEMPERATURES

SPRING

STATION	TEMP	90%	75%	50%	25%	10%
Mesa Experiment Station	40	MAR 27	APR 4	APR 13	APR 22	APR 30
	36	FEB 23	MAR 7	MAR 19	MAR 31	APR 12
	32	JAN 27	FEB 13	MAR 3	MAR 21	APR 7
	28		JAN 20	FEB 8	FEB 25	MAR 13
	24				JAN 24	FEB 10
	20					JAN 19

FALL

	10%	25%	50%	75%	90%
40	OCT 17	OCT 25	NOV 2	NOV 10	NOV 18
36	OCT 25	NOV 2	NOV 11	NOV 20	NOV 28
32	NOV 2	NOV 13	NOV 24	DEC 5	DEC 16
28	NOV 8	NOV 25	DEC 14	JAN 1	
24	DEC 13	DEC 26			
20	JAN 10				

GROWING SEASON MEAN LENGTH (DAYS)

Temp	Litchfield Park	Mesa Experiment Station
40	209	203
36	235	237
32	270	266
28	311	309
24	365	365
20	365	365

Source: ARIZONA CLIMATE, SUPPLEMENT NO. II, PROBABILITY OF LOW TEMPERATURES OCCURRING IN ARIZONA, April 1967, University of Arizona Press.

Temperature

EXTREMES OF FREEZE AND GROWING SEASON DATA
1896-1985

LATEST DATE OF FREEZE IN SPRING (32 Degrees or Lower)

City	Office	March	31 1897
Airport	Office	April	4 1945

EARLIEST DATE OF FREEZE IN AUTUMN (32 Degrees or Lower)

City	Office	November	5 1922
Airport	Office	November	3 1946
Airport	Office	November	4 1956

LONGEST FREEZE FREE PERIOD (Above 32 Degrees)

City	Office	368 Days	February 19 1952 through February 21 1953
Airport	Office	693 Days	January 13 1977 through December 6 1978
Airport	Office	1897 Days	November 23 1979 through January 31 1985

SHORTEST FREEZE FREE PERIOD (Above 32 Degrees)

City	Office	222 Days	March 31 1897 through November 8 1897
Airport	Office	231 Days	April 4 1945 through November 21 1945
Airport	Office	236 Days	March 13 1956 through November 4 1956

Temperature

FREEZE AND GROWING SEASON DATA -- "THE COLDER SECTIONS OF THE VALLEY"

The climate of any urban area is continuously changing as housing developments are created from open lots and fields, as vegetation such as citrus groves are added or taken away, as streets are paved, and even, in the extreme, as the natural topography is altered.

Each home actually creates its own microclimate, absorbing heat during the day and radiating it at night. The temperature range can vary 5 to 10 degrees in relatively short distances. Groups of homes, prominent geographical features such as the Papago Buttes, Camelback and Mummy Mountain, South Mountains and Squaw Peak, large buildings such as the Central Avenue groups, broad streets and parking lots, and even a concentration of heat-producing automobile engines actually create what are known as "heat islands" that are separate, but nevertheless important, factors in the climate of the Phoenix area.

In general, however, the farther a particular location is away from these "heat islands", the more temperatures are likely to be colder than at other locations in the valley. Tolleson, on the west side of Phoenix, surrounded by agricultural land, is frequently 3 to 5 degrees colder than most locations in the city. However, there are some locations inside the city that are as much as 5 to 10 degrees colder than temperatures reported at Sky Harbor Airport. These locations are unique only because of their individual relationships to the drainage of cold air and their distance from "heat islands".

At night, cold air generally flows like water toward lowest sections and often "pools" when it can go no farther or is "dammed" by a natural or unnatural obstruction. On still nights, the ground loses heat more rapidly than the air itself, and a temperature inversion forms where the air close to the ground is much colder than the air a short distance above the ground. At times there may be as much as 5 to 6 degrees difference between the temperature at ground level and the 5-foot level, where standard temperatures are measured. Hence, frost may appear on the grass and low vegetation when temperatures above freezing are reported.

In summary, the temperature structure of the area is quite complex, varying from point to point in the valley and is constantly changing with the time of the day and with the growth of the community. Most people can, with a little study, determine the relationship of their local minimum to the forecast low temperature in the colder sections of the valley.

NOTE: The lowest temperature of the day usually occurs within one hour before or after sunrise; while the highest temperature usually occurs about two to three hours before sunset.

V. PRECIPITATION

NORMAL TOTAL AND MAXIMUM AND MINIMUM TOTAL BY MONTHS AND YEAR OF OCCURRENCE
1896-1985

	NORMAL	MAXIMUM	YEAR	MINIMUM	YEAR
January	0.73	3.67	1897	0.00	1912 1924 1972
February	0.59	4.64	1905	0.00	1912 1967 1984
March	0.81	4.82	1941	0.00	1933 1956 1959 1984
April	0.27	3.36	1926	0.00	1904 1920 1948 1960 1962
May	0.14	1.31	1930	0.00	1899 1911 1913 1932 1939 1942 1945 1946 1952 1974 1983
June	0.17	1.70	1972	0.00	1897 1900 1901 1908 1913 1916 1917 1923 1928 1935 1939 1942 1944 1945 1946 1947 1953 1963 1964 1968 1969 1970 1971 1974 1983 1985
July	0.74	6.47	1911	0.02	1931
August	1.02	5.33	1951	trace	1973 1975
September	0.64	5.41	1939	0.00	1953 1957 1968 1973
October	0.63	4.40	1972	0.00	1898 1905 1909 1934 1950 1952 1973
November	0.54	3.61	1905	0.00	1897 1903 1904 1912 1916 1917 1932 1937 1943 1945 1948 1956 1980
December	0.83	3.98	1967	0.00	1900 1901 1917 1958 1973 1981
Annual	7.11	19.73	1905	2.82	1956

Years in Which There Were 5 (the most) Calendar Months Without Measurable Precipitation:

1904 1938 1945 1948 1972 1973

Years in Which All Twelve Calendar Months had Measurable Precipitation:

1921 1925 1927 1949 1965 1979

Precipitation

DAILY NORMALS OF PRECIPITATION
1951-1980

	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE	
	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE
1	.03	0.03	.02	0.75	.02	1.34	.02	2.15	.00	2.40	.00	2.54
2	.03	0.06	.02	0.77	.02	1.36	.02	2.17	.00	2.40	.00	2.54
3	.03	0.09	.02	0.79	.03	1.39	.02	2.19	.01	2.41	.00	2.54
4	.03	0.12	.02	0.81	.03	1.42	.02	2.21	.01	2.42	.00	2.54
5	.03	0.15	.02	0.83	.03	1.45	.01	2.22	.01	2.43	.00	2.54
6	.03	0.18	.02	0.85	.03	1.48	.01	2.23	.01	2.44	.00	2.54
7	.03	0.21	.02	0.87	.03	1.51	.01	2.24	.01	2.45	.00	2.54
8	.03	0.24	.02	0.89	.03	1.54	.01	2.25	.01	2.46	.00	2.54
9	.03	0.27	.02	0.91	.03	1.57	.01	2.26	.01	2.47	.00	2.54
10	.03	0.30	.02	0.93	.03	1.60	.01	2.27	.01	2.48	.00	2.54
11	.03	0.33	.02	0.95	.03	1.63	.01	2.28	.01	2.49	.00	2.54
12	.02	0.35	.02	0.97	.03	1.66	.01	2.29	.01	2.50	.00	2.54
13	.02	0.37	.02	0.99	.03	1.69	.01	2.30	.01	2.51	.00	2.54
14	.02	0.39	.02	1.01	.03	1.72	.01	2.31	.01	2.52	.01	2.55
15	.02	0.41	.02	1.03	.03	1.75	.01	2.32	.01	2.53	.01	2.56
16	.02	0.43	.02	1.05	.03	1.78	.01	2.33	.01	2.54	.01	2.57
17	.02	0.45	.02	1.07	.03	1.81	.01	2.34	.00	2.54	.01	2.58
18	.02	0.47	.02	1.09	.03	1.84	.01	2.35	.00	2.54	.01	2.59
19	.02	0.49	.02	1.11	.03	1.87	.01	2.36	.00	2.54	.01	2.60
20	.02	0.51	.02	1.13	.03	1.90	.01	2.37	.00	2.54	.01	2.61
21	.02	0.53	.02	1.15	.03	1.93	.01	2.38	.00	2.54	.01	2.62
22	.02	0.55	.02	1.17	.02	1.95	.01	2.39	.00	2.54	.01	2.63
23	.02	0.57	.02	1.19	.02	1.97	.01	2.40	.00	2.54	.01	2.64
24	.02	0.59	.02	1.21	.02	1.99	.00	2.40	.00	2.54	.01	2.65
25	.02	0.61	.02	1.23	.02	2.01	.00	2.40	.00	2.54	.01	2.66
26	.02	0.63	.03	1.26	.02	2.03	.00	2.40	.00	2.54	.01	2.67
27	.02	0.65	.03	1.29	.02	2.05	.00	2.40	.00	2.54	.01	2.68
28	.02	0.67	.03	1.32	.02	2.07	.00	2.40	.00	2.54	.01	2.69
29	.02	0.69			.02	2.09	.00	2.40	.00	2.54	.01	2.70
30	.02	0.71			.02	2.11	.00	2.40	.00	2.54	.01	2.71
31	.02	0.73			.02	2.13			.00	2.54		
MONTHLY NORMAL		0.73		0.59		0.81		0.27		0.14		0.17

Precipitation

DAILY NORMALS OF PRECIPITATION
1951-1980

	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE	NORM	TO DATE
1	.01	2.72	.03	3.48	.03	4.50	.02	5.13	.02	5.76	.02	6.30
2	.01	2.73	.03	3.51	.03	4.53	.02	5.15	.02	5.78	.02	6.32
3	.02	2.75	.03	3.54	.03	4.56	.02	5.17	.02	5.80	.02	6.34
4	.02	2.77	.03	3.57	.03	4.59	.02	5.19	.02	5.82	.02	6.36
5	.02	2.79	.03	3.60	.02	4.61	.02	5.21	.02	5.84	.02	6.38
6	.02	2.81	.03	3.63	.02	4.63	.02	5.23	.02	5.86	.02	6.40
7	.02	2.83	.03	3.66	.02	4.65	.02	5.25	.02	5.88	.02	6.42
8	.02	2.85	.04	3.70	.02	4.67	.02	5.27	.02	5.90	.02	6.44
9	.02	2.87	.04	3.74	.02	4.69	.02	5.29	.01	5.91	.02	6.46
10	.02	2.89	.04	3.78	.02	4.71	.02	5.31	.01	5.92	.02	6.48
11	.02	2.91	.04	3.82	.02	4.73	.02	5.33	.01	5.93	.03	6.51
12	.02	2.93	.04	3.86	.02	4.75	.02	5.35	.01	5.94	.03	6.54
13	.02	2.95	.04	3.90	.02	4.77	.03	5.38	.01	5.95	.03	6.57
14	.02	2.97	.04	3.94	.02	4.79	.02	5.40	.01	5.96	.03	6.60
15	.02	2.99	.04	3.98	.02	4.81	.02	5.42	.02	5.98	.03	6.63
16	.02	3.01	.04	4.02	.02	4.83	.02	5.44	.02	6.00	.03	6.66
17	.02	3.03	.03	4.05	.02	4.85	.02	5.46	.02	6.02	.03	6.69
18	.03	3.06	.03	4.08	.02	4.87	.02	5.48	.02	6.04	.03	6.72
19	.03	3.09	.03	4.11	.02	4.89	.02	5.50	.02	6.06	.03	6.75
20	.03	3.12	.03	4.14	.02	4.91	.02	5.52	.02	6.08	.03	6.78
21	.03	3.15	.03	4.17	.02	4.93	.02	5.54	.02	6.10	.03	6.81
22	.03	3.18	.03	4.20	.02	4.95	.02	5.56	.02	6.12	.03	6.84
23	.03	3.21	.03	4.23	.02	4.97	.02	5.58	.02	6.14	.03	6.87
24	.03	3.24	.03	4.26	.02	4.99	.02	5.60	.02	6.16	.03	6.90
25	.03	3.27	.03	4.29	.02	5.01	.02	5.62	.02	6.18	.03	6.93
26	.03	3.30	.03	4.32	.02	5.03	.02	5.64	.02	6.20	.03	6.96
27	.03	3.33	.03	4.35	.02	5.05	.02	5.66	.02	6.22	.03	6.99
28	.03	3.36	.03	4.38	.02	5.07	.02	5.68	.02	6.24	.03	7.02
29	.03	3.39	.03	4.41	.02	5.09	.02	5.70	.02	6.26	.03	7.05
30	.03	3.42	.03	4.44	.02	5.11	.02	5.72	.02	6.28	.03	7.08
31	.03	3.45	.03	4.47			.02	5.74			.03	7.11
MONTHLY NORMAL		0.74		1.02		0.64		0.63		0.54		0.83

Precipitation

GREATEST NUMBER OF DAYS WITH TRACE OR MORE AND 0.01 INCHES OR MORE BY MONTHS AND YEAR OF OCCURRENCE AND AVERAGE NUMBER OF DAYS WITH 0.01 INCHES OR MORE BY MONTHS

	1896-1985		1896-1985		1940-1985
	TRACE OR MORE	YEAR	0.01 OR MORE	YEAR	AVERAGE 0.01 OR MORE
January	15	1916	11	1916	3.9
February	17	1905	14	1905	3.9
March	16	1905	12	1905	3.5
April	18	1926	13	1926	1.8
May	8	1935 1941	4	1976	0.9
June	8	1925 1931 1972	4	1899 1932	0.7
July	18	1984	13	1896	4.3
August	18	1963	11	1913 1929	4.7
September	16	1897	9	1939	3.0
October	12	1907 1972	9	1907 1972	2.7
November	13	1913	11	1905	2.5
December	14	1965	11	1914 1923 1926 1965	3.8
Annual	106	1905	74	1905	35.6
Least Annual	37	1953	18	1953	

Arizona Indian Proverb: "The south rain brings with it the beautiful odors of the land of everlasting summer and brightens the leaves of growing things".

Precipitation

GREATEST NUMBER OF DAYS WITH 0.10 INCHES OR MORE, 0.50 INCHES OR MORE, AND 1.00 INCH OR MORE BY MONTHS AND YEAR OF OCCURRENCE
1896-1985

	0.10 OR MORE	YEAR	0.50 OR MORE	YEAR	1.00 OR MORE	YEAR
January	6	1955 1979	3	1897 1955	2	1905
February	9	1905	6	1905	1	1908
March	6	1905 1952	5	1941	3	1941
April	6	1952	3	1905	1	1926 1941
May	2	1917 1930 1941 1957	1	1930 1976 1944	0	
June	2	1967 1972	1	1955 1965 1972	1	1972
July	7	1896	4	1955	3	1955
August	7	1963	5	1951	2	1943
September	8	1939	3	1939 1984	2	1903 1939 1946 1984
October	5	1957 1974	4	1972	1	1911 1914 1932 1957 1972
November	9	1905	3	1931 1982	1	1902 1905 1918 1919 1923 1931 1941
December	9	1914	5	1959	1	1898 1902 1915 1926 1940
Annual	43	1905	18	1905	5	1941 1946
Least	9	1904	0	1953	0	Many Years

Arizona Indian Proverb: "When the clouds hang on the mountain side after a rain and the sun shines on the top of the mountain, the storm is over".

Precipitation

MAXIMUM AMOUNTS FOR 5, 10, 15, AND 30 MINUTES; 1, 2, AND 24 HOURS BY MONTHS AND DAY AND YEAR OF OCCURRENCE 1896-1985

	5 Minutes	10 Minutes	15 Minutes	30 Minutes	1 Hour	2 Hours	24 Hours
January	0.35 3/1926	0.44 3/1926	0.56 3/1926	0.67 3/1926	0.75 3/1926	0.76 3/1926	1.76 9-10/1905
February	0.30 6/1935	0.41 10/1963	0.43 10/1963	0.44 10/1963	0.50 12/1936	0.67 6/1935	1.69 5-6/1935
March	0.26 4/1941	0.41 4/1941	0.43 4/1941	0.46 12/1941	0.61 12/1941	0.77 4/1941 3/1983	2.04 2-3/1983
April	0.32 19/1951	0.61 19/1951	0.75 19/1951	0.76 19/1951	0.76 19/1951	0.92 8/1926	1.66 5-6/1926
May	0.35 20/1979	0.45 20/1979	0.53 20/1979	0.59 20/1979	0.60 20/1979	0.61 20/1979	1.12 4-5/1930
June	0.30 12/1955	0.40 22/1972	0.52 22/1972	0.62 22/1972	0.92 22/1972	1.20 22/1972	1.64 21-22/1972
July	0.50 24/1978	0.70 26/1952	0.91 26/1952	1.15 17/1908	1.30 26/1917	1.47 2/1911	4.98 1-2/1911
August	0.90 16/1983	1.14 16/1983	1.17 16/1983	1.23 20/1978	1.72 18/1966	1.81 6/1918	2.27 27-28/1951
September	0.68 16/1969	1.00 16/1969	1.14 16/1969	1.27 16/1969	1.41 4/1939	2.20 4/1939	3.06 3-4/1939
October	0.68 1/1981	0.72 1/1981	0.72 1/1981	0.86 30/1928	0.93 30-31/1928	1.03 30-31/1928	2.27 18-19/1972
November	0.36 10/1931	0.38 10/1931 23/1919	0.40 23/1919	0.54 14/1918	0.67 14/1918	0.75 27/1919	2.40 9-10/1923
December	0.13 13/1975	0.22 19/1967	0.28 13/1975	0.38 19/1967	0.50 19/1967	0.68 19/1967	1.92 30-31/1915
Annual	0.90 AUG 16/1983	1.14 AUG 16/1983	1.17 AUG 16/1969	1.27 SEP 16/1969	1.72 AUG 18/1966	2.20 SEP 4/1939	4.98 JUL 1-2/1911

Precipitation

GREATEST NUMBER OF CONSECUTIVE DAYS WITH TRACE OR MORE
1896-1985

10 days	July	22-31	1921	total	0.38
10 days	December	3-12	1926	total	2.50
9 days	January	9-17	1897	total	3.59
9 days	December	12-20	1967	total	3.98
9 days	February	13-21	1980	total	2.09
9 days	July	10-18	1984	total	0.49

GREATEST NUMBER OF CONSECUTIVE DAYS WITH 0.01 INCHES OR MORE
1896-1985

10 days	December	3-12	1926	total	2.50
9 DAYS	February	13-21	1980	total	2.09
8 days	January	9-16	1897	total	3.59
7 days	January	15-21	1917	total	1.62
7 days	December	13-19	1967	total	3.98

GREATEST NUMBER OF CONSECUTIVE DAYS WITH 0.25 INCHES OR MORE
1896-1985

4 days	February	12-15	1931	total	2.83
4 days	December	12-15	1932	total	1.69

GREATEST NUMBER OF CONSECUTIVE DAYS WITH 0.50 INCHES OR MORE
1896-1985

3 days	February	12-14	1931	total	2.48
3 days	February	5-7	1935	total	2.48
3 days	March	12-14	1941	total	2.67
3 days	August	27-19	1951	total	3.77

GREATEST NUMBER OF CONSECUTIVE DAYS WITH 1.00 INCH OR MORE
1896-1985

2 days	January	9-10	1905	total	2.69
2 days	July	1-2	1911	total	5.49
2 days	July	25-26	1936	total	2.35
2 days	July	17-18	1946	total	2.31
2 days	September	17-18	1946	total	2.65
2 days	July	24-25	1955	total	2.05

Arizona Indian Proverb: "When the sun is in his house (in a halo or circle), it will rain soon".

Precipitation

GREATEST NUMBER OF CONSECUTIVE DAYS WITHOUT TRACE OR MORE
1896-1985

91 days	January	6	1984-April 5	1984
88 days	October	17	1917-January 12	1918
88 days	April	10	1945-July 6	1945
79 days	October	7	1916-December 24	1916
77 days	April	23	1913-July 8	1913
72 days	April	26	1974-July 6	1974
67 days	May	1	1983-July 6	1983
66 days	April	28	1946-July 2	1946

GREATEST NUMBER OF CONSECUTIVE DAYS WITHOUT 0.01 INCHES OR MORE
1896-1985

160 days	December	30	1971-June 6	1972
143 days	March	2	1960-July 22	1960
125 days	July	16	1973-November 17	1973
119 days	March	24	1904-July 20	1904
118 days	February	4	1899-June 1	1899
117 days	March	11	1970-July 5	1970
114 days	March	11	1968-July 2	1968
105 days	September	1	1938-December 14	1938
105 days	March	24	1945-July 6	1945
104 days	October	1	1917-January 12	1918
102 days	April	6	1909-July 16	1909
96 days	March	26	1902-June 29	1902
95 days	April	3	1974-July 6	1974
92 days	April	10	1975-July 10	1975
91 days	January	6	1984-April 5	1984

AMOUNTS AND DATES OF ALL SNOWFALLS
1896-1985

1.0 inch	January 20 1933	
1.0 inch	January 20-21 1937	(1 to 4 inches fell in parts of the city and remained in shaded areas until the 23 and 24)
0.6 inches	February 2 1939	
0.2 inches	March 12 1917	
0.1 inches	November 28 1919	
0.1 inches	December 11 1985	

TRACE

December 9 1898	May 9 1930	December 13 1967
December 10 1898	February 1 1939	December 20 1968
January 20 1904	February 8 1939	December 25 1974
December 5 1909	February 9 1939	March 3 1976
December 25 1911	April 1 1949	February 2 1985
May 1 1915	January 12 1951	February 3 1985
December 25 1916	January 13 1962	February 4 1985
February 18 1981	January 17 1962	

Precipitation

DAILY FREQUENCY OF OCCURRENCE OF TRACE OR MORE IN PERCENT
1896-1985

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	19	26	28	23	14	3	21	47	33	26	12	17
2	19	27	34	20	18	7	23	52	34	24	11	19
3	10	22	38	17	12	10	22	51	26	18	10	22
4	13	24	33	17	14	13	19	49	29	20	11	23
5	19	23	30	12	13	6	22	41	30	17	10	21
6	21	36	12	19	7	10	30	38	29	16	11	20
7	20	32	16	17	8	7	32	47	27	14	19	13
8	23	30	20	21	8	7	31	42	24	10	20	22
9	22	34	23	22	11	8	27	47	19	13	18	27
10	30	24	32	11	13	11	36	51	33	8	13	28
11	28	30	24	18	14	7	36	42	28	18	12	19
12	24	28	27	19	10	7	37	49	27	17	21	30
13	29	21	24	19	7	11	36	42	27	13	16	21
14	29	18	22	11	9	6	41	43	22	14	18	22
15	18	27	19	18	7	6	53	40	13	21	22	17
16	27	24	14	13	11	4	51	47	19	12	24	22
17	26	20	17	16	16	9	49	44	20	13	20	18
18	19	16	22	17	12	9	38	44	28	16	21	17
19	32	30	23	9	11	7	41	40	18	19	11	21
20	29	29	23	7	12	7	38	31	17	14	11	23
21	24	31	26	19	7	11	58	31	11	13	16	22
22	21	19	24	20	9	10	52	42	28	12	19	22
23	24	19	26	10	10	9	54	46	19	11	22	20
24	22	18	23	9	7	10	50	41	23	17	23	12
25	26	23	24	11	8	10	56	37	19	7	18	24
26	21	28	28	13	7	11	53	41	22	7	14	24
27	31	23	17	24	7	10	52	23	20	14	17	28
28	30	13	23	19	8	19	42	33	17	17	19	29
29	23	9	20	17	12	18	52	43	19	20	16	26
30	22		12	10	8	16	54	28	22	17	13	22
31	18		12		9		42	29		13		21

For Example: Precipitation has fallen on 24 percent of the Christmas Days during the 90-year period from 1896 through 1985.

Precipitation

DAILY FREQUENCY OF OCCURRENCE OF 0.01 INCHES OR MORE IN PERCENT
1896-1985

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	12	18	18	13	6	1	4	27	19	14	10	8
2	10	21	26	10	6	4	10	27	17	14	4	12
3	18	19	28	6	6	7	10	32	14	16	4	13
4	7	18	22	7	7	4	7	24	11	16	4	17
5	14	14	17	10	6	0	9	22	22	13	6	13
6	12	21	8	10	4	1	10	23	14	10	4	10
7	13	24	6	7	4	3	14	21	12	9	11	11
8	13	26	18	7	3	2	12	21	11	3	13	12
9	13	23	16	7	6	1	9	28	4	10	11	18
10	19	19	22	4	7	3	10	19	16	6	12	20
11	24	20	12	12	3	0	16	21	19	7	10	14
12	16	21	19	12	6	4	12	29	14	8	10	18
13	21	13	11	6	2	4	12	19	19	6	10	16
14	17	14	16	3	6	1	14	20	16	10	11	12
15	13	18	11	7	3	3	23	21	6	11	13	12
16	19	16	11	7	3	1	24	17	6	11	12	16
17	20	14	12	7	3	4	30	20	8	8	13	16
18	13	13	13	7	6	3	18	22	16	12	13	13
19	16	24	9	7	4	3	16	17	10	7	8	18
20	14	18	12	6	4	3	23	14	9	8	7	16
21	16	23	13	9	1	6	22	17	10	9	11	19
22	11	13	18	17	4	6	28	23	13	8	16	17
23	18	11	14	4	0	3	26	22	14	8	17	13
24	12	13	16	4	2	1	31	17	10	9	12	10
25	14	18	17	1	0	2	23	16	9	7	13	16
26	12	16	18	3	1	3	30	21	12	6	8	19
27	18	12	11	16	2	1	16	17	11	10	13	17
28	22	4	13	17	1	6	24	13	7	9	17	18
29	20	9	11	11	6	4	28	23	11	13	10	20
30	18		4	6	1	7	24	14	14	14	7	8
31	10		9		1		18	13		11		17

For Example: Precipitation of 0.01 inches or more has fallen on 16 percent of the Christmas Days during the 90-year period from 1896 through 1985.

Precipitation

DAILY FREQUENCY OF OCCURRENCE OF 0.10 INCHES OR MORE IN PERCENT
1896-1985

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	6	7	10	7	3	0	4	12	11	8	3	2
2	6	10	16	4	1	3	6	10	7	4	4	7
3	10	10	13	1	0	1	1	19	3	8	1	6
4	3	11	10	4	6	1	3	12	4	7	1	11
5	8	6	7	6	3	0	3	12	12	10	3	10
6	11	13	3	7	1	1	6	12	7	4	3	6
7	8	11	1	1	3	0	6	10	7	3	4	6
8	6	7	11	4	1	2	6	7	9	3	7	6
9	6	11	6	4	3	0	1	11	3	3	8	11
10	12	17	11	1	3	1	2	8	4	2	9	12
11	14	12	7	9	1	0	8	12	7	1	6	9
12	4	11	12	4	3	3	4	13	12	6	9	12
13	17	9	8	1	0	0	4	6	12	1	4	11
14	4	12	7	1	3	0	10	4	4	6	6	10
15	10	11	8	4	1	0	11	11	0	1	8	12
16	8	4	9	4	0	0	12	10	6	7	10	9
17	9	3	6	6	0	3	14	10	4	6	8	7
18	11	6	6	3	0	1	11	10	10	10	7	7
19	4	7	4	4	1	1	7	10	4	6	4	11
20	10	4	8	1	4	0	9	8	4	2	7	7
21	8	10	6	3	1	3	12	7	4	3	8	13
22	4	6	8	9	1	3	11	9	4	3	11	10
23	4	6	9	3	0	1	9	9	6	6	13	6
24	6	7	4	1	1	1	13	11	7	1	7	6
25	9	9	8	1	0	2	17	7	7	3	6	11
26	6	7	10	1	1	0	13	12	7	3	6	11
27	7	8	6	9	0	0	10	10	8	3	8	8
28	7	4	7	10	1	1	8	6	4	7	10	11
29	12	1	4	4	0	0	12	14	7	8	6	8
30	10		1	1	0	3	12	1	4	10	6	7
31	6		7		1		10	7		6		11

For Example: Precipitation of 0.10 inches or more has fallen on 11 percent of the Christmas Days during the 90-year period from 1896 through 1985.

Precipitation

DAILY FREQUENCY OF OCCURRENCE OF 0.25 INCHES OR MORE IN PERCENT
1896-1985

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	3	10	1	1	0	1	4	7	6	1	2
2	3	4	9	1	1	0	4	4	1	2	3	4
3	9	6	8	1	0	1	0	10	0	6	1	3
4	1	7	7	1	3	0	0	4	1	3	1	3
5	2	4	7	3	1	0	0	11	6	4	1	4
6	4	7	0	4	0	0	3	7	3	2	3	1
7	3	7	0	0	0	0	4	6	6	1	3	3
8	1	0	1	1	0	0	3	3	4	1	3	4
9	2	6	4	3	3	0	0	7	3	3	2	10
10	8	9	7	1	3	1	1	1	2	1	8	8
11	8	7	6	6	0	0	4	4	3	1	4	6
12	2	7	9	1	0	1	4	9	6	1	6	4
13	7	3	6	0	0	0	1	4	10	0	3	9
14	1	6	4	1	0	0	3	2	1	4	1	6
15	6	8	4	0	0	0	7	3	0	1	3	9
16	6	1	6	4	0	0	10	6	1	4	3	1
17	6	1	4	3	0	0	11	3	4	1	4	4
18	7	3	0	0	0	1	8	6	7	7	3	7
19	1	4	1	1	0	0	3	3	2	4	3	7
20	7	3	2	1	1	0	3	4	3	2	1	3
21	3	6	1	1	1	1	8	6	1	1	4	9
22	1	1	4	4	0	1	4	1	1	3	4	4
23	1	0	4	3	0	1	3	6	2	2	11	1
24	3	4	1	0	0	1	8	8	7	0	4	4
25	4	1	1	1	0	1	11	3	2	0	4	6
26	2	3	4	0	0	0	7	7	7	3	6	7
27	4	4	3	1	0	0	7	6	7	1	4	6
28	6	2	6	7	1	1	6	6	4	6	4	10
29	9	1	4	0	0	0	6	9	7	4	4	4
30	7		0	0	0	0	6	0	4	7	4	4
31	1		3		0		3	3		1		8

For Example: Precipitation of 0.25 inches or more have fallen on 6 percent of the Christmas Days during the 90-year period from 1896 through 1985.

Precipitation

DAILY FREQUENCY OF OCCURRENCE OF 0.50 INCHES OR MORE IN PERCENT
1896-1985

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0	6	0	0	0	1	4	2	2	0	0
2	0	0	4	0	0	0	4	1	0	1	0	0
3	7	3	2	1	0	0	0	6	0	3	0	3
4	1	4	6	0	2	0	0	1	1	3	0	1
5	0	3	3	3	0	0	0	10	3	1	1	1
6	1	4	0	1	0	0	0	3	0	1	0	0
7	1	1	0	0	0	0	1	2	3	0	0	1
8	0	0	0	1	0	0	1	1	3	1	0	1
9	1	1	3	0	0	0	0	0	3	3	1	6
10	4	1	4	1	1	0	0	0	1	1	4	6
11	3	1	1	4	0	0	0	0	1	0	4	6
12	1	4	3	0	0	1	3	2	4	0	2	1
13	1	2	3	0	0	0	1	0	6	0	3	6
14	1	4	1	0	0	0	0	0	1	0	1	1
15	2	2	3	0	0	0	4	1	0	1	1	4
16	3	1	3	1	0	0	3	1	1	0	1	0
17	2	0	1	0	0	0	6	1	4	0	1	1
18	1	1	0	0	0	0	3	1	6	4	3	4
19	1	1	1	1	0	0	3	0	0	3	1	4
20	3	1	1	0	1	0	1	1	0	0	1	0
21	1	3	0	0	0	0	4	1	1	0	3	1
22	0	0	1	1	0	1	1	0	0	0	1	1
23	0	0	0	3	0	1	0	1	2	2	6	0
24	1	3	0	0	0	0	6	4	3	0	1	4
25	3	1	1	0	0	0	7	1	0	0	1	1
26	0	3	0	0	0	0	4	4	4	0	3	1
27	1	1	1	0	0	0	7	3	4	1	1	2
28	3	1	4	1	0	0	1	4	4	3	1	4
29	3	0	0	0	0	0	1	3	4	0	3	1
30	3		0	0	0	0	1	0	0	6	1	3
31	1		0		0		1	3		1		4

For Example: Precipitation of 0.50 inches or more have fallen on 1 percent of the Christmas Days during the 90-year period from 1896 through 1985.

Precipitation

DAILY FREQUENCY OF OCCURRENCE OF 1.00 INCH OR MORE IN PERCENT
1896-1985

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0	0	0	0	0	1	3	1	0	0	0
2	0	0	0	0	0	0	1	1	0	0	0	0
3	0	1	1	0	0	0	0	1	0	1	0	0
4	0	0	1	0	0	0	0	0	1	0	0	0
5	0	0	0	1	0	0	0	3	1	0	0	0
6	0	0	0	0	0	0	0	1	0	1	0	0
7	0	0	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	3	1	0	0
9	1	0	0	0	0	0	0	0	0	0	0	0
10	1	0	0	0	0	0	0	0	1	0	1	1
11	1	0	0	1	0	0	0	0	1	0	1	0
12	1	0	1	0	0	0	1	0	1	0	1	0
13	0	0	0	0	0	0	0	0	3	0	0	1
14	0	0	1	0	0	0	0	0	1	0	1	1
15	0	0	0	0	0	0	0	1	0	0	0	0
16	1	0	1	0	0	0	1	1	1	0	0	0
17	1	0	0	0	0	0	3	0	3	0	0	0
18	0	0	0	0	0	0	1	1	1	0	0	1
19	0	0	0	0	0	0	0	0	0	3	0	3
20	0	0	0	0	0	0	1	1	0	0	1	0
21	0	0	0	0	0	0	1	0	0	0	0	0
22	0	0	0	0	0	1	1	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	1	1	1	0	0	0
25	0	0	0	0	0	0	4	0	0	0	0	0
26	0	0	0	0	0	0	4	0	3	0	1	0
27	0	0	0	0	0	0	3	1	1	1	1	1
28	0	0	0	0	0	0	1	0	1	0	0	0
29	1	0	0	0	0	0	1	0	1	0	0	0
30	1		0	0	0	0	1	0	0	1	0	3
31	0		0		0		0	0		1		0

For Example: Precipitation of 1.00 inch or more has fallen on 3 percent of the August 1st's during the 90-year period from 1896 through 1985.

Precipitation

FREQUENCY OF OCCURRENCE OF 0.01 INCHES OR MORE OF PRECIPITATION
ON CONSECUTIVE DAYS IN PERCENT IN MONTHS
1896-1985

	ANY ONE DAY	2ND DAY	3RD DAY	4TH DAY	5TH DAY	6TH DAY	7TH DAY	8TH DAY
January	15.3	3.0	1.1	0.4	0.2	0.1	0.1	*
February	17.1	3.8	1.5	0.6	0.3	0.2	*	*
March	14.2	3.0	1.1	0.3	0.1	*	0.0	*
April	7.8	1.7	0.3	0.1	*	0.0	0.0	0.0
May	3.7	0.6	0.1	0.0	0.0	0.0	0.0	0.0
June	3.0	0.5	*	0.0	0.0	0.0	0.0	0.0
July	17.7	2.8	0.8	0.3	0.1	0.1	0.0	0.0
August	20.5	3.2	0.9	0.3	*	0.0	0.0	0.0
September	12.1	2.3	0.7	0.2	0.1	*	0.0	0.0
October	9.8	2.0	0.5	0.1	0.0	0.0	0.0	0.0
November	10.3	2.4	0.7	0.1	0.0	0.0	0.0	0.0
December	14.8	2.9	1.0	0.3	0.1	0.1	0.1	*

*Less than .05 percent

Example: In January, on the average, there was a 15.3 percent frequency of occurrence of 0.01 inches or more of precipitation on any day. For a 2-day period there was a 3.0 percent, for a 3-day period 1.1 percent, for a 4-day period 0.4 percent, for a 5-day period 0.2 percent, for a 6-day period and a 7-day period 0.1 percent, and for an 8-day period less than 0.05 percent.

Arizona Indian Proverb: "When the sun sets unhappily (with a hazy veiled face) then will the morning be angry with wind, storm, and sand".

"The moon her face if red be, of water she speaks".

Precipitation

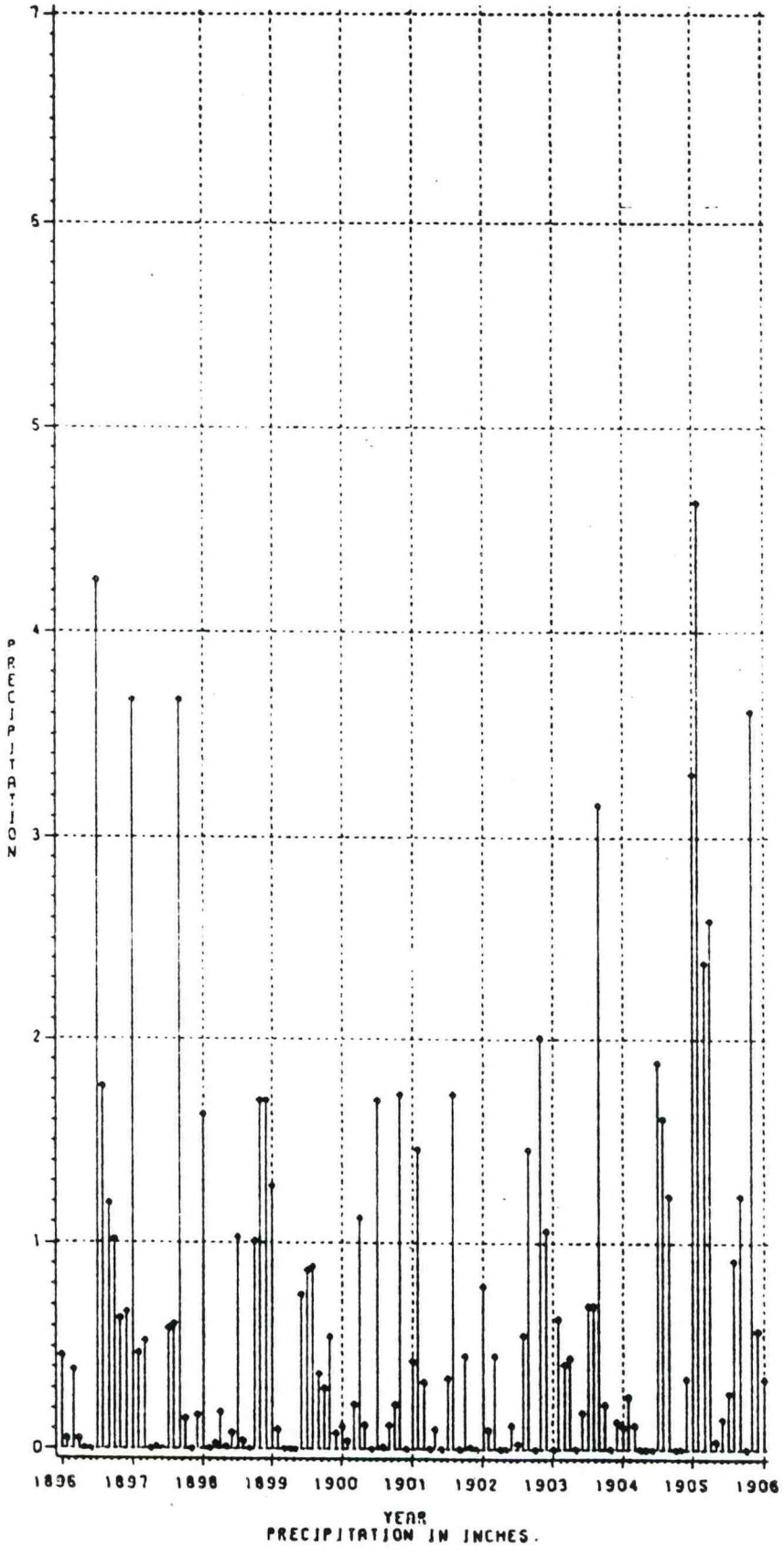
ESTIMATED RETURN PERIODS FOR SHORT-DURATION PRECIPITATION
(Inches)

		RETURN PERIOD (YEARS)						
		1	2	5	10	25	50	100
	5 MIN	0.17	0.26	0.38	0.47	0.59	0.68	0.77
D	10 MIN	0.27	0.40	0.59	0.72	0.91	1.06	1.20
U	15 MIN	0.34	0.50	0.74	0.92	1.15	1.34	1.52
R	30 MIN	0.47	0.70	1.03	1.27	1.60	1.86	2.10
A	1 HR	0.60	0.88	1.30	1.61	2.02	2.35	2.66
T	2 HR	0.65	0.94	1.39	1.72	2.15	2.49	2.82
I	3 HR	0.69	1.01	1.48	1.82	2.27	2.62	2.97
O	6 HR	0.81	1.16	1.70	2.07	2.57	2.96	3.35
N	12 HR	0.91	1.30	1.90	2.30	2.84	3.26	3.69
	24 HR	1.02	1.44	2.10	2.53	3.12	3.57	4.04

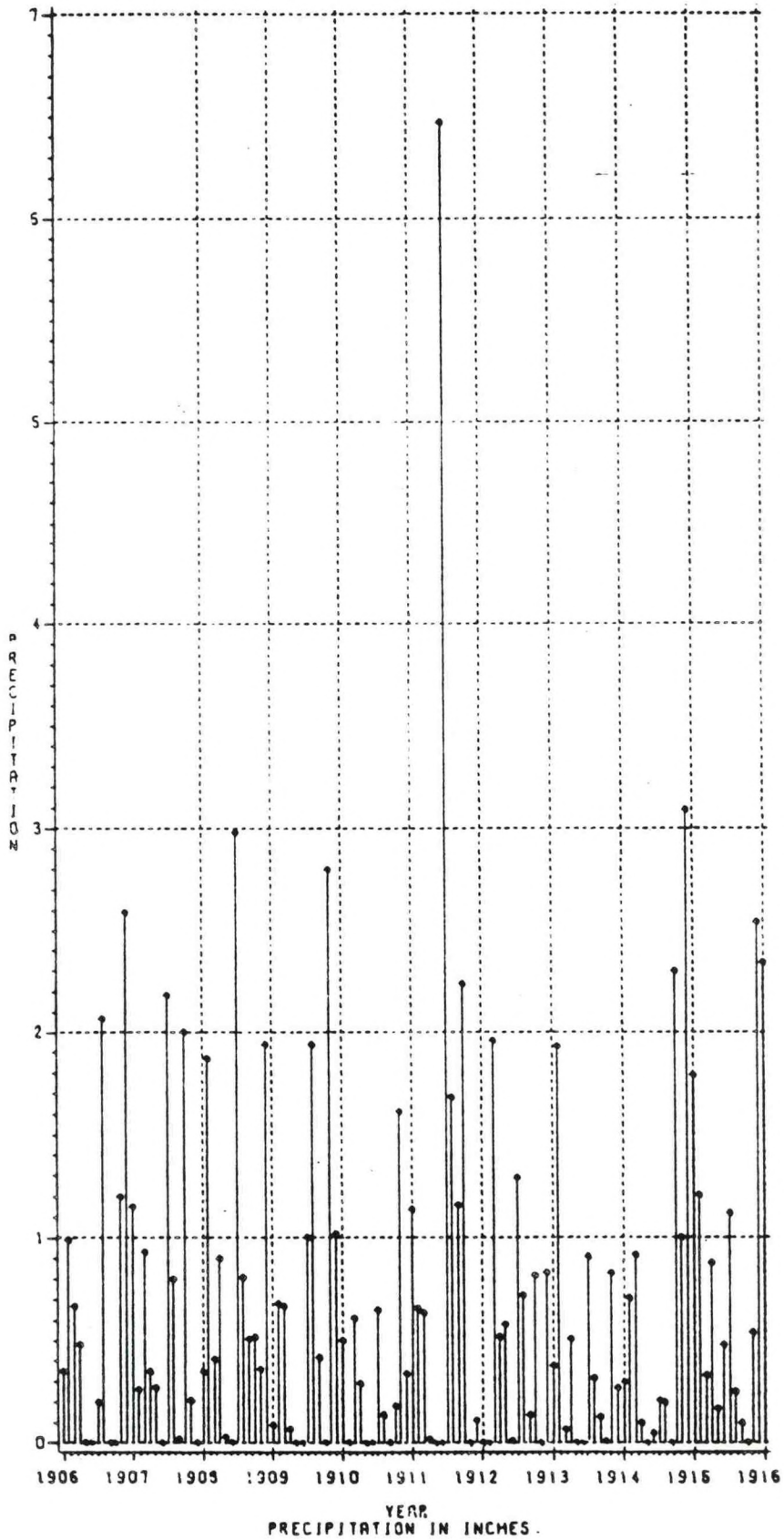
Examples: This means that 0.74 inches of rain can be expected in 15 minutes once every 5 years.
This means that 0.60 inches of rain can be expected in 1 hour once every year.
This means that 2.57 inches of rain can be expected in 6 hours once every 25 years.

Source: ESTIMATED RETURN PERIODS FOR SHORT DURATION PRECIPITATION IN ARIZONA, Technical Memorandum WBTM WR-44, October 1969.

MONTHLY PRECIPITATION AT PHOENIX.



MONTHLY PRECIPITATION AT PHOENIX.



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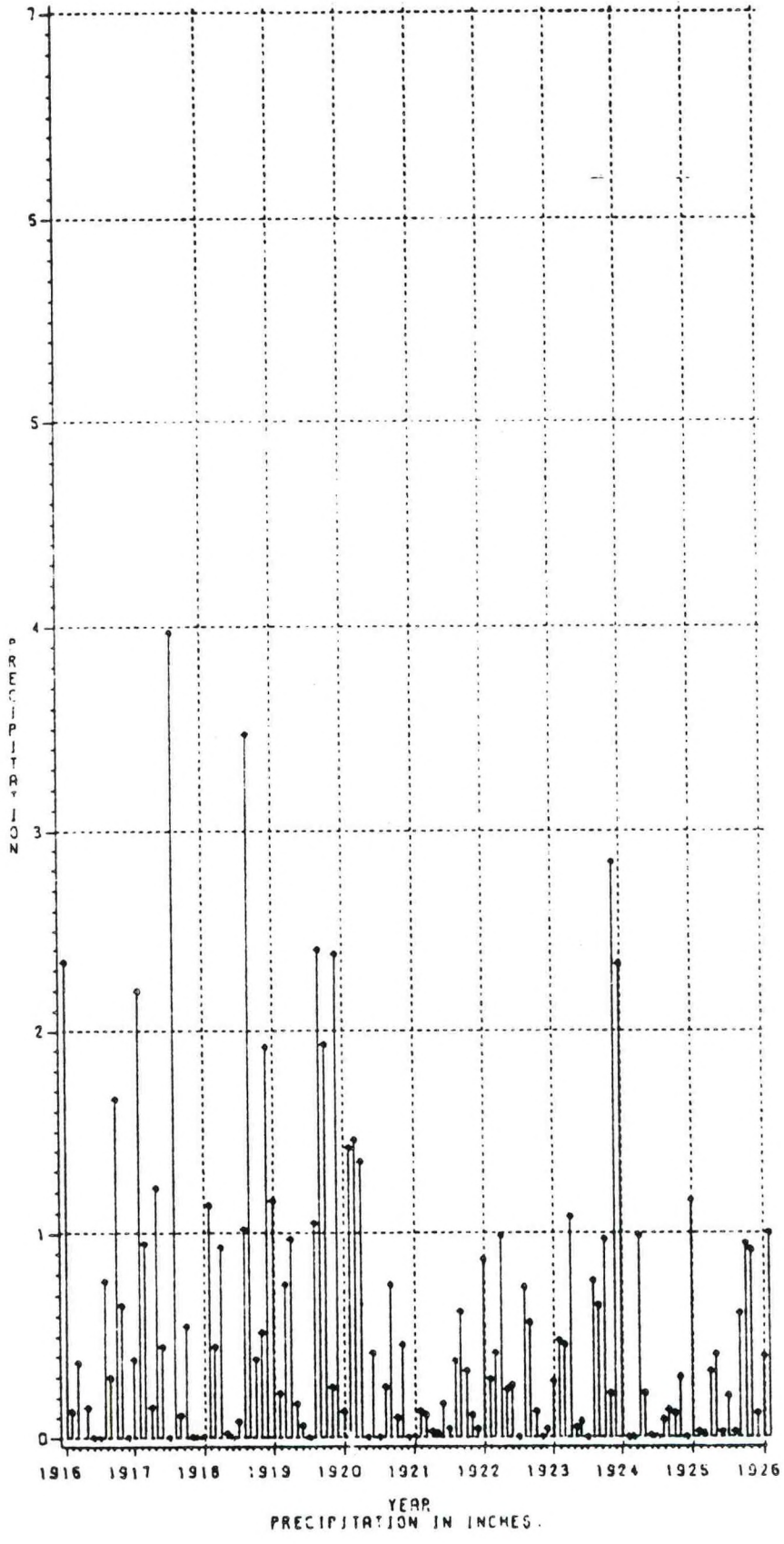

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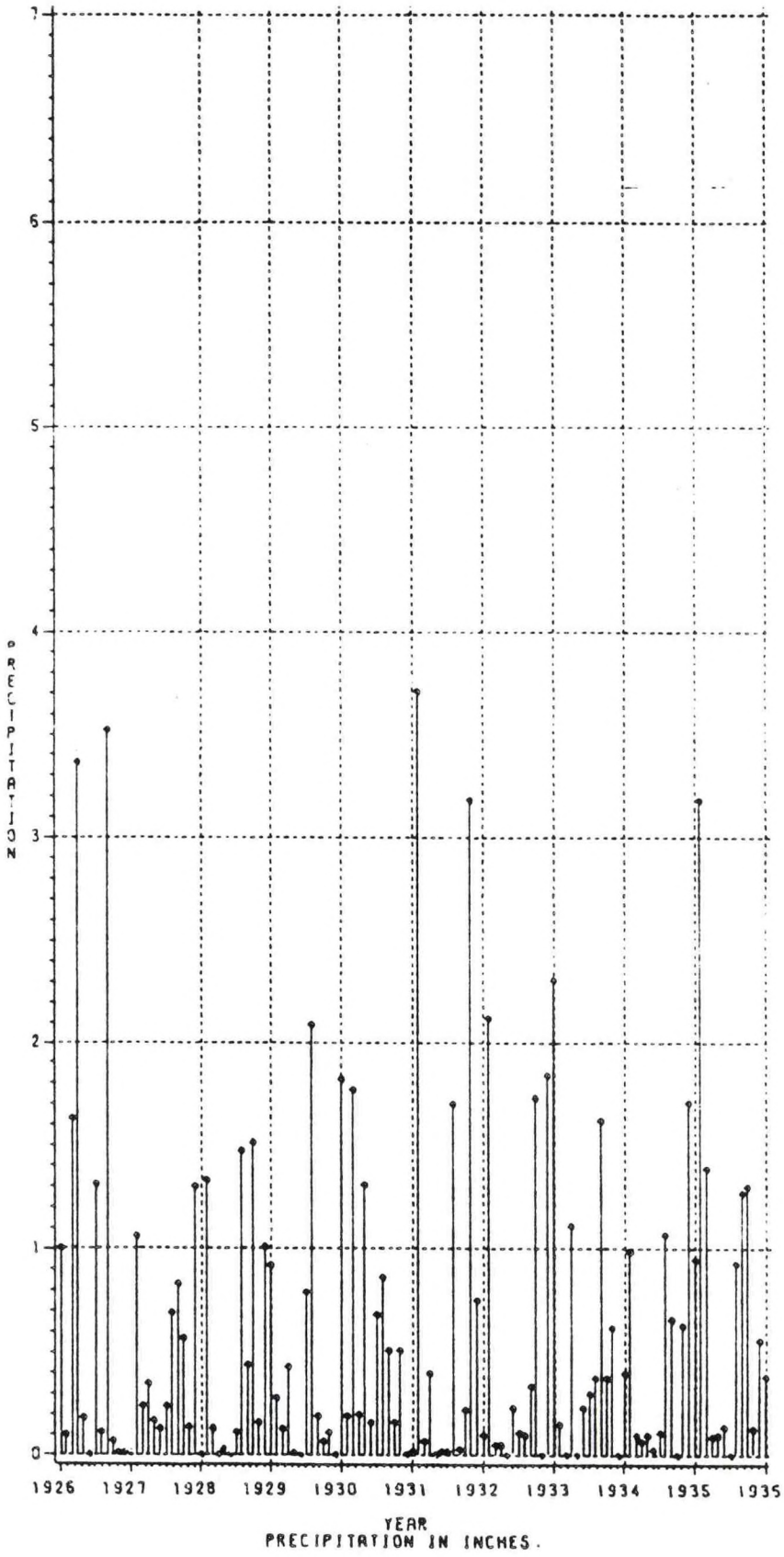

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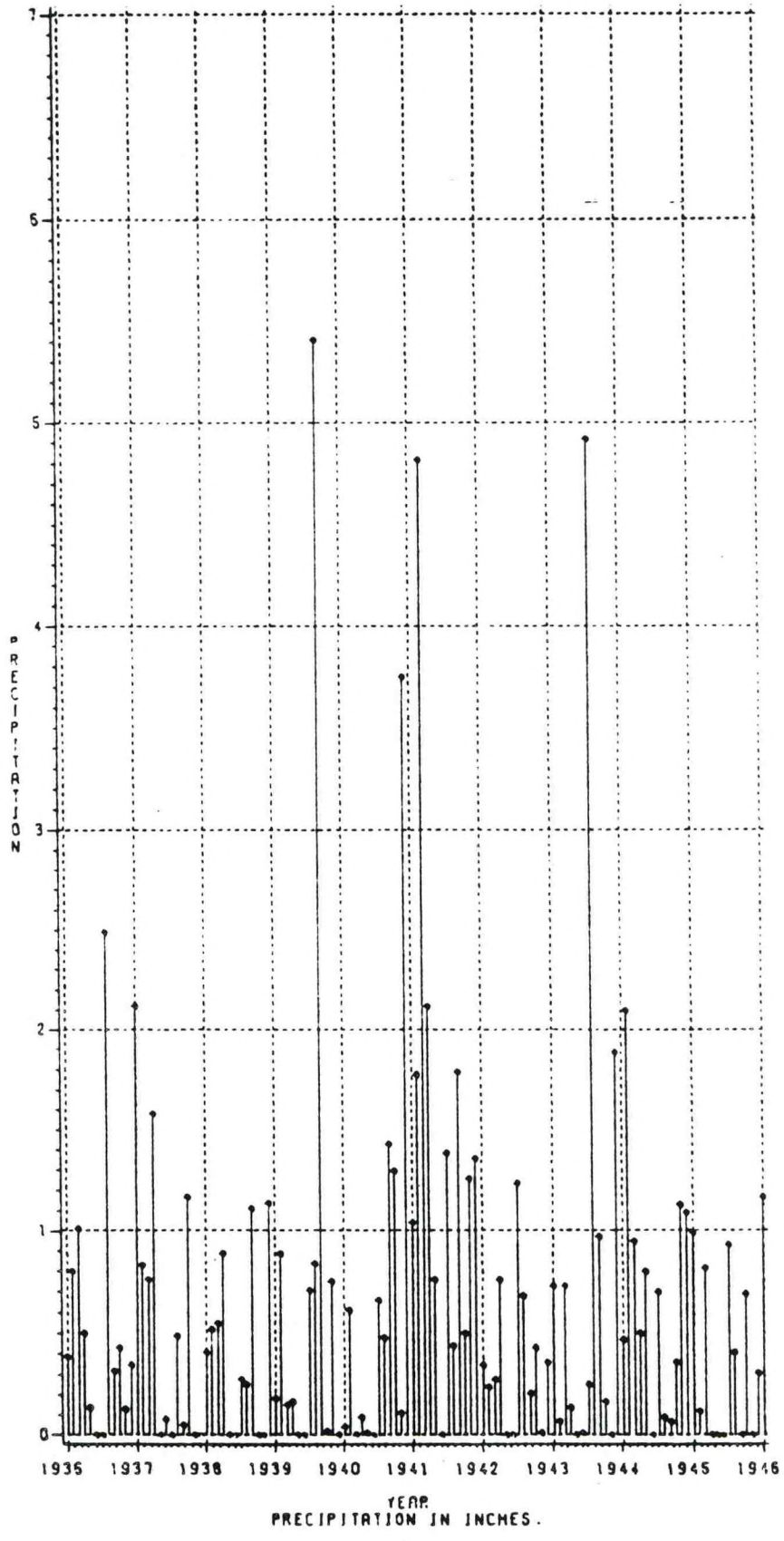

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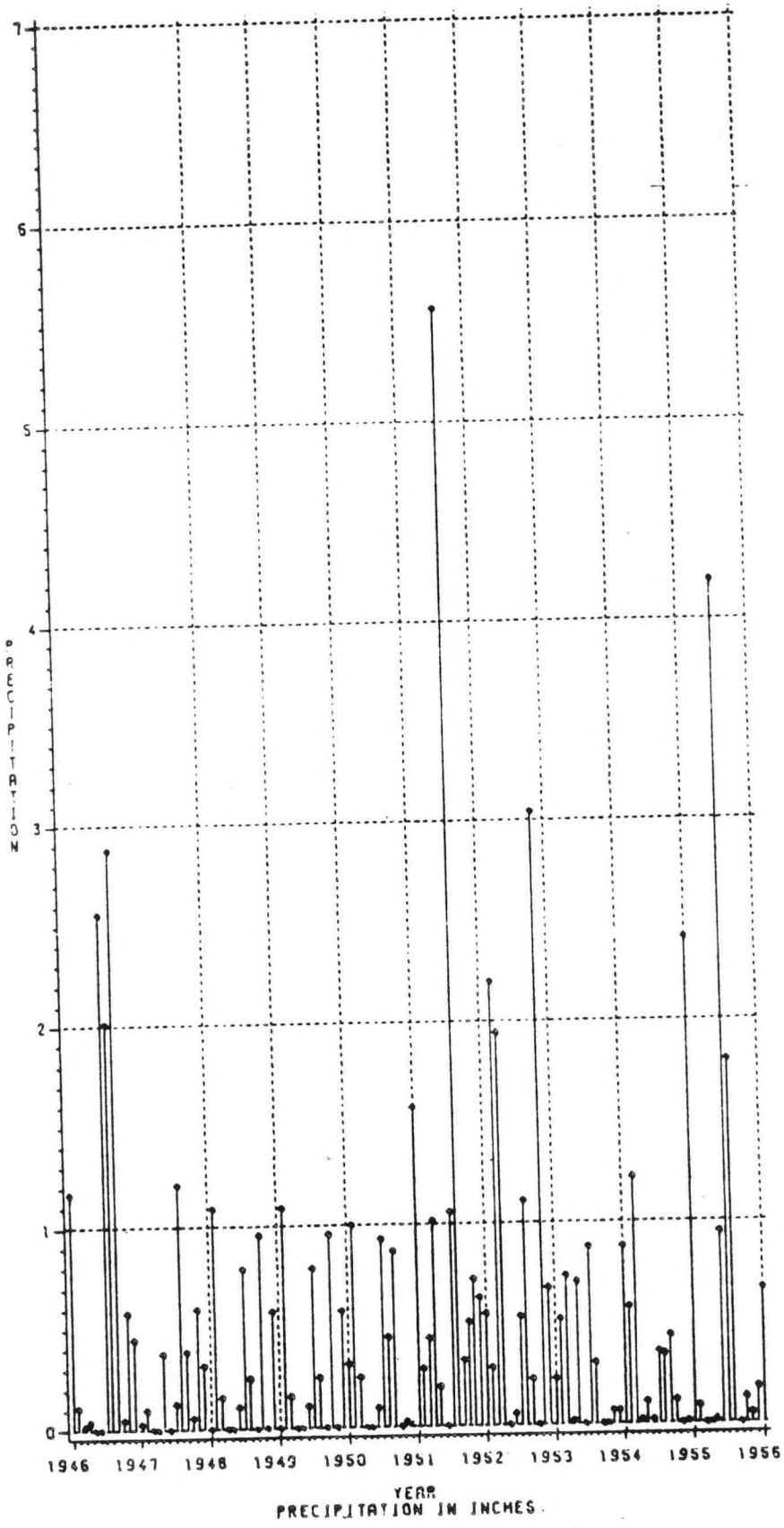

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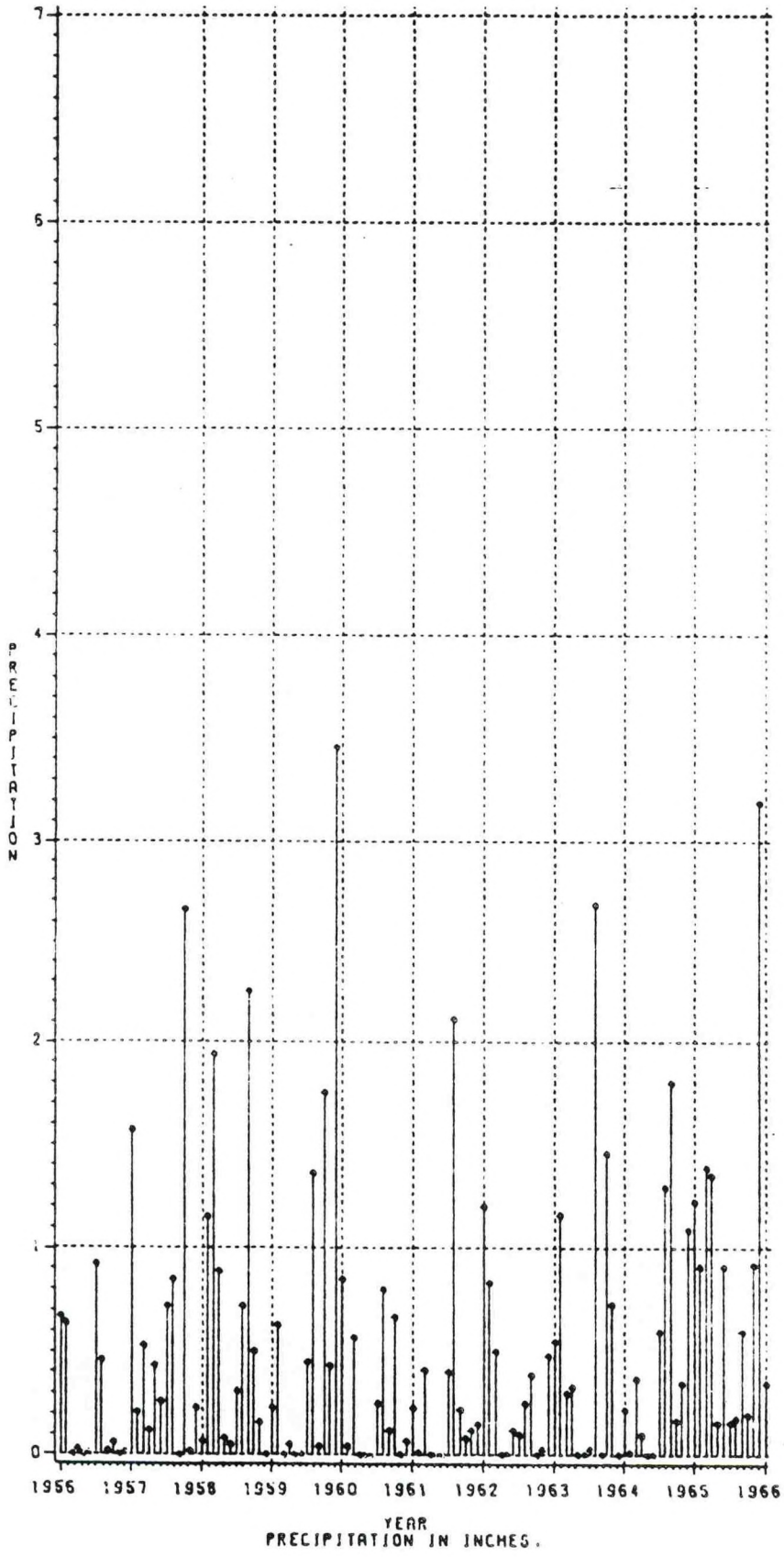

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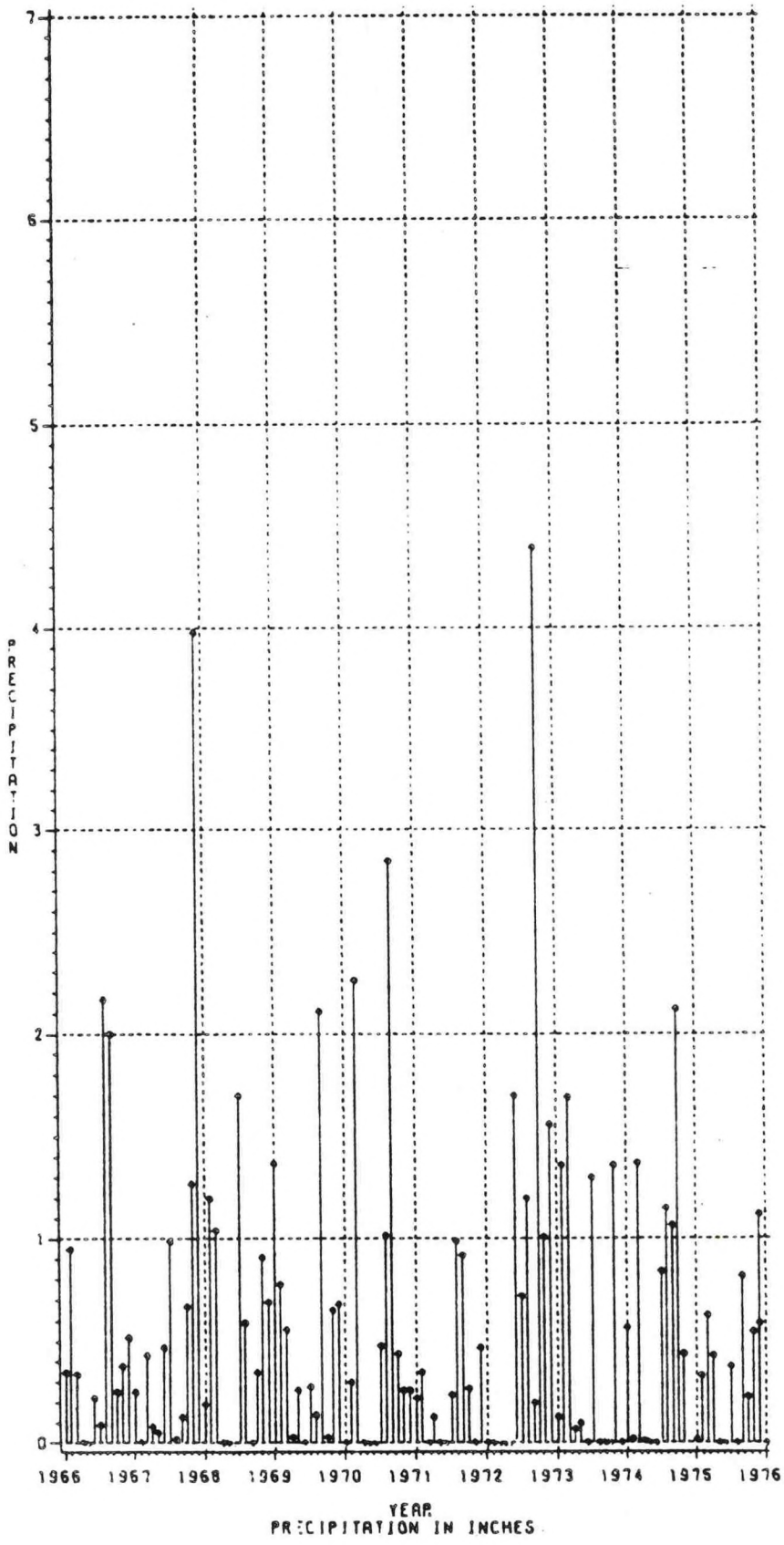
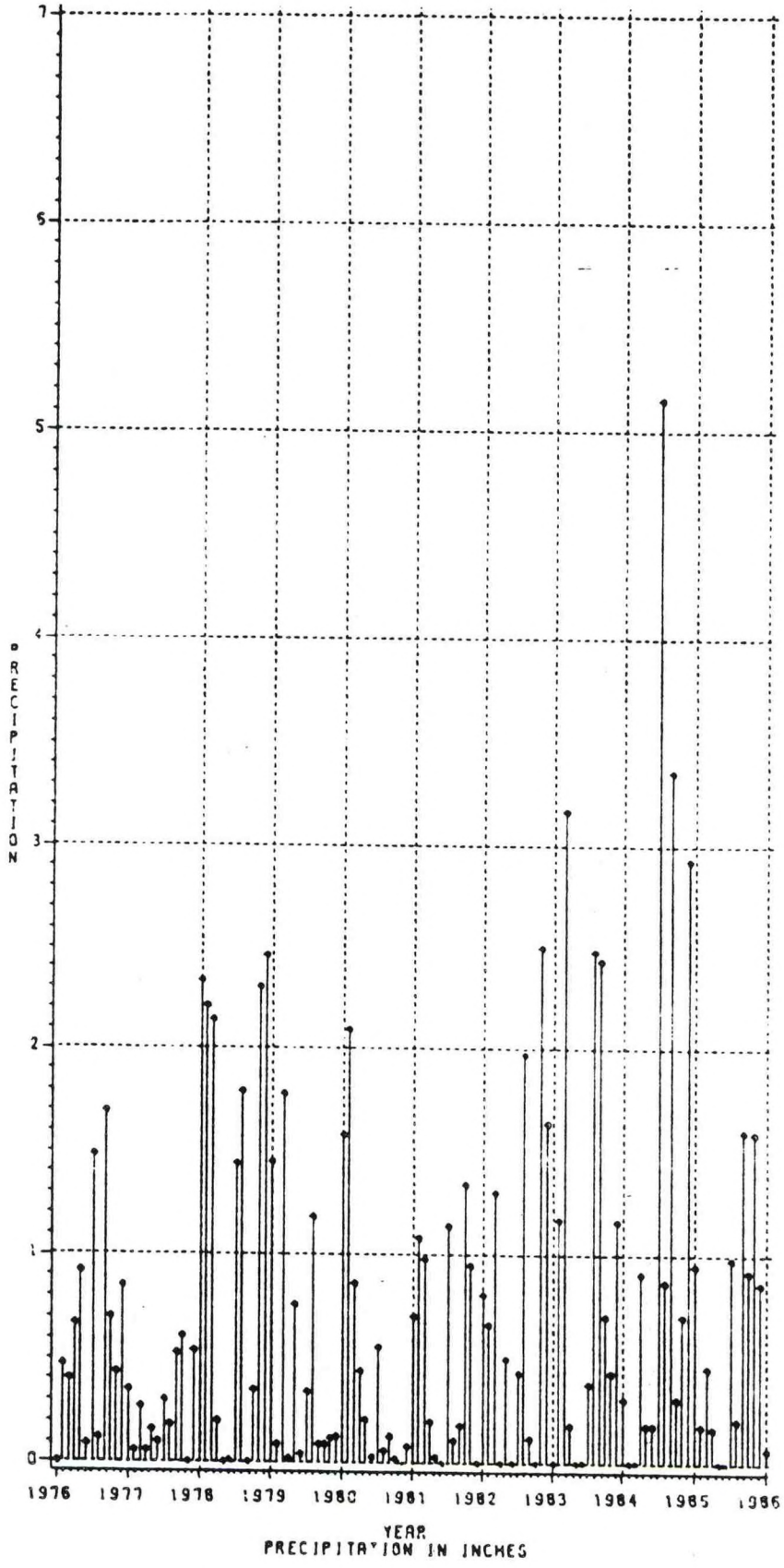


MONTHLY PRECIPITATION AT PHOENIX



VI. THUNDERSTORMS, HAIL, AND TORNADOES -- ARIZONA MONSOON

The so-called "Arizona Monsoon" is a marginal summer type monsoon, not nearly as intense as those in other places of the globe. Some people insist that it should not be called "monsoon" but rather a period of summer thunderstorm activity. It is, however, a seasonal change in the wind direction from a westerly to a southerly wind during July, August, and early September.

It is not always a sustained period because there may be periods of hot, dry weather interspersed with the hot, humid days. The monsoon feature is most pronounced over the southern and central sections of the state and becomes more marginal over the northern part. The monsoon onset is often dramatic and occurs when the very hot, dry air is replaced by a surge of moist, tropical air. The source of the moisture is the Gulf of Mexico, the Gulf of California, and the Pacific Ocean off the west coast of Mexico.

The Monsoon moisture, combined with the intense solar heating, creates uncomfortable heat and humidity and produces an abundance of thunderstorms. These thunderstorms at times are very intense and may cause very heavy rain with flash flooding and destructive winds and blowing dust with visibility near zero.

For statistical purposes, a monsoon day has been defined as a day with average dew points of 55 degrees or higher. This figure represents a relatively high moisture value and is easily measured.

1896-1985

Average Date of Monsoon Onset	July 8
Earliest Date of Onset	June 16 1925
Latest Date of Onset	July 24 1943
In Two Out of Three Years, Onset is Between	July 1 and July 16
Average Date of First Break	August 16

1948-1985

Average Total Number of Monsoon Days	57
Greatest Number of Monsoon Days	99 in 1984
	86 in 1983
Least Number of Monsoon Days	27 in 1962

Greatest number of consecutive monsoon days was 72, from June 25 through September 4, 1984. This was also the greatest number of consecutive days with dew point of 60 degrees or higher.

Arizona Indian Proverb: "Rain will occur about a week after locusts begin to sing at night".

Thunderstorms, Hail, and Tornadoes

AVERAGE NUMBER OF DAYS WITH THUNDERSTORMS AND AVERAGE NUMBER OF DAYS WITH HAIL BY MONTHS
1896-1985

	THUNDERSTORMS	HAIL
January	0.3	0.1
February	0.6	0.2
March	0.8	0.2
April	0.9	0.1
May	1.0	0.1
June	1.2	*
July	6.8	*
August	8.1	*
September	3.6	0.1
October	1.2	0.1
November	0.7	*
December	0.4	0.1
Annual	25.6	1.0

*Less than .05

GREATEST NUMBER OF DAYS WITH THUNDERSTORMS AND GREATEST NUMBER OF DAYS WITH HAIL BY MONTHS AND YEAR OF OCCURRENCE 1896-1985

	THUNDERSTORMS	YEAR	HAIL	YEAR
January	3	1982	2	1945 1949
February	5	1931	2	1942
March	7	1905	2	1912 1941 1952 1973
April	12	1926	1	1908 1915 1926 1933 1940 1941 1942 1944 1951 1976
May	5	1926 1976 1982	1	1907 1920 1926 1930 1973
June	6	1972	1	1955 1965 1972
July	16	1908 1917 1984	1	1915 1940 1970 1984
August	20	1909	1	1905 1928 1942
September	13	1897	1	1903 1935 1950 1964 1984
October	4	1912 1928	2	1981
November	4	1959	1	1898 1905 1984
December	4	1940 1965	1	1921 1923 1926 1928 1949 1964
Annual	48	1905	5	1926

Thunderstorms, Hail, and Tornadoes

FREQUENCY OF THUNDERSTORM OCCURRENCE IN PERCENT BY DAYS
1896-1985

DAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
1	1	10	30	18	7
5	2	14	29	16	5
10	3	20	28	13	4
15	5	26	26	10	3
20	6	30	23	8	2
25	8	32	20	7	2

Arizona Indian Proverbs: "The clouds must look like many sheep before the rains will come".

"When the clouds rise in terraces of white, soon will the country of the corn priests be pierced with arrows of rain".

LIGHTNING

It is estimated that some 1800 thunderstorms are in progress over the earth's surface at any given time and that lightning strikes the earth 100 times each second.

The average annual death toll for lightning is greater than for tornadoes or hurricanes. In 1984, 3 people were injured by lightning and 5 killed in Arizona. For the U.S., the figures were: 253 injuries and 67 fatalities. For the period 1959-1984, there were 71 injuries and 41 deaths in Arizona, and 6472 injuries and 2574 deaths nationally.

Lightning is a secondary effect of electrification within a thunderstorm cloud system. Updrafts of warm moist air rising into cold air can cause small cumulus clouds to grow into large cumulonimbus cloud systems and on into thunderstorms. The transition from a small cloud to a turbulent electrified giant can occur in as little as 30 minutes.

As a thunderstorm cumulonimbus develops, interactions of charged particles, external and internal electrical fields, and complex energy exchanges produce a large electrical field within the cloud. The distribution of electricity in a thunderstorm cloud is usually a concentration of positive charge in the frozen upper layers, and a large negative charge around a positive area in the lower portions of the cloud.

PROTECT YOURSELF

When a thunderstorm threatens, get inside a home or large building, or inside an all metal (not convertible) vehicle.

Inside a home, avoid using the telephone, except for emergencies.

If outside with no time to reach a safe building or an automobile, follow these rules:

Do not stand underneath a natural lightning rod such as a tall, isolated tree in an open area.

Avoid projecting above the surrounding landscape, as you would do if you were standing on a hilltop, in an open field, on the beach, or fishing from a small boat.

Get out of and away from open water.

Get away from tractors and other metal farm equipment.

Get off of and away from motorcycles, scooters, golf carts, and bicycles. Put down golf clubs.

Stay away from wire fences, clotheslines, metal pipes, rails, and other metallic paths which would carry lightning to you from some distance away.

Avoid standing in small isolated sheds or other small structures in open areas.

In a forest, seek shelter in a low area under a thick growth of small trees. In open areas, go to a low place such as a ravine or valley. Be alert for flash floods.

If you are hopelessly isolated in a level field or prairie and you feel your hair stand on end, drop to your knees and bend forward putting your hands on your knees. Do not lie flat on the ground.

(These are from the National Weather Service Lightning Safety).

DESCRIPTION OF KNOWN TORNADOES AND FUNNEL CLOUDS IN THE GREATER PHOENIX AREA 1955-1985

June 13, 1955	Severe thunderstorms were widespread over much of the eastern two-thirds of the state throughout the day. About 10:00 a.m., several funnel clouds were observed underneath one main cloud north of the White Tank Mountains. Later the same day (about 4:30 p.m.) possible tornado damage occurred east of Queen Creek Village; damage was estimated at $8,000.
July 25, 1956	At about 4:00 p.m., a small tornado caused damage along a path about 200 feet long and 15 feet wide near 4421 North 14th Street. About $250 damage was caused.
October 23, 1956	At about 3:30 p.m., a tornado was observed near Lake Pleasant Reservoir. High winds and terrific roaring in the clouds accompanied the tornado.
March 7, 1958	At 10:17 a.m., a funnel cloud was sighted in Litchfield Park, but it did not touch the ground.
March 11, 1958	About 5 miles south of Phoenix, a possible tornado damaged a chick hatchery to the extent of about $2,000.
September 24, 1958	Between 10:05 and 10:35 a.m., a well-developed tornado skipped for 4 miles across open desert 8 miles northeast of Mesa.

July 19, 1961	Between 7:18 and 7:25 p.m., a funnel cloud was observed over Tempe. Funnel did not touch the ground.
July 22, 1961	A possible tornado destroyed two hangars and damaged a number of aircraft at Deer Valley Airport.
September 8, 1961	At 1:30 p.m. possible tornadoes caused damage to roofs extending from 7th Avenue and Southern across 7th Street and Broadway, to Camelback High School, to Scottsdale and to Paradise Valley.
March 11, 1965	At 10:37 a.m. a small funnel was observed about 20 miles east-northeast of Sky Harbor Airport. It did not touch the ground.
December 19, 1967	At 5;30 p.m. a small tornado moved through a Mesa subdivision from the southwest and unroofed several homes.
July 4, 1968	At 5:30 p.m., a small tornado destroyed a house, injuring two occupants, about 5 miles east of Mesa. Two other homes and a barn suffered considerable damage. The storm was moving toward the southwest when first sighted, then turned toward the northwest and followed a short skipping path before dissipating about 5 minutes after being sighted. $25,000 damage.
July 20, 1968	At 8:30 p.m., a small tornado damaged several homes in the eastern part of Phoenix near 52nd Street and Van Buren. The funnel moved toward the southwest, accompanied by a loud roaring noise but apparently remained on the ground for only a few blocks. Damages estimated at $10,000.
October 3, 1968	At 7:00 p.m., a storm struck the residential section of Glendale causing severe damage to two apartment buildings. Several parked automobiles were heavily damaged by falling concrete blocks. Flying glass injured several persons, hospitalized one. The tornado then followed a skipping path toward the west, causing additional damage to buildings and parked trailer-houses along the way.
February 22, 1969	At 1:45 p.m., a funnel cloud touched ground briefly in the open country near Deer Valley Airport. The funnel moved to the east. No damage.
July 19, 1970	At 7;25 p.m., a funnel cloud touched ground in the open desert country of Paradise Valley. The funnel moved toward the southwest but remained visible for only a few minutes. No damage.

September 5, 1970 — At 4:00 p.m., a funnel cloud touched ground in Scottsdale about 1/2 mile west of Scottsdale Road moving east. It crossed Scottsdale Road at Fillmore Street and continued farther east for about 1 mile. Fences and trees were blown down and a number of roofs were damaged along the path. Length of path was 1-1/2 miles, width of path was 100 yards, about $10,000 damage to property.

August 30, 1971 — At 5:45 p.m., a tornado touched ground for about 10 minutes in an unpopulated section of south Tempe. It then moved toward the northeast into a populated area and caused considerable property damage to homes, utilities, and trees. Several homes were completely demolished, and a number of others suffered extensive roof damage. Most of the injured were not hurt badly. Many were struck by flying glass. The tornado touched down briefly in west Mesa before dissipating. The storm was accompanied by heavy hail.

September 14, 1971 — At about 7:15 p.m., three funnel clouds aloft were observed approaching and converging on the Treadway Ranch located near 83rd Avenue and Thomas Road. These funnels were about 50 feet wide at the bases and tapered larger to the cloud base. They touched down briefly over the corral area where there were 15 people and many prize horses. They ripped off the roof of one of the barns and did other damage to structures and equipment in the immediate area. Miraculously no people or animals were inured by the debris. Eyewitnesses stated that the first two funnels struck almost simultaneously followed by a dead calm before the third struck. A light shower attended their passage, and the tornadoes dissipated after striking the ranch. Damage was estimated at about $29,000.

October 18, 1971 — At 1:40 p.m., a small tornado touched ground in the vicinity of 56th Street and Shea Boulevard in Paradise Valley. It moved east-northeast along the north side of Shea Boulevard and crossed Scottsdale Road, touching ground for about 15 minutes. The length of path was about 1/2 mile and the width of path was 50 yards. Two houses in its path suffered considerable damage and several others had roof damage. Total damage amounted to about $15,000. A second funnel cloud formed a short time alter but did not touch the ground and lasted only for a few minutes.

June 13, 1972 — At 7:33 p.m., a small tornado touched ground briefly near 40th Avenue and Southern avenue in southwest Phoenix. Two house-trailers were demolished, a utility pole blown down, and several trees uprooted.

The length of path was about 1/4 mile. Estimated damage was about $40,000.

June 21, 1972 — At 4:30 p.m., a small tornado caused about $15,000 property damage in Apache Junction, mostly to mobile homes.

June 21, 1972 — At 5:05 p.m., two funnel clouds were observed together south of Tempe over open country then dissipated a few minutes after sighting. At 5:35 p.m., a funnel cloud was observed touching ground briefly over open country south of Tempe; a bluish white flash was observed at the base of the funnel.

June 21, 1972 — At 6:30 p.m., extremely heavy wind damage to property along a 2-mile front was inflicted in the northern part of Paradise Valley. Inspection of the area by National Weather Service personnel after the storm, indicated that several tornado funnels, traveling together, were probably responsible for the destruction. One witness reported seeing two funnels close to one another at the height of the storm. There was also evidence that these funnel clouds touched ground in the vicinity of 36th Street and Camelback Road in Phoenix, then traveled northeastward into Paradise Valley. Also the pattern of damage in the area indicated that more than one vortex of high velocity winds passed through the area. Several hundred homes were either completely demolished or extensively damaged. Many homes that escaped complete destruction on the night of the 21st, were further damaged on the morning of the 22nd, when additional thunderstorms in the area caused heavy rains. The Arizona Statistical Division of Emergency Services made an estimate of the total property damage for the two-day period (June 21-22, 1972) of $10,800,000. Because of the relatively short-time internal between storms on the two days, it was impossible to estimate the tornado damage alone on the 21st.

August 12, 1972 — At 8:00 p.m., a small tornado touched ground briefly in south Phoenix in an unpopulated area. No damage.

September 10, 1972 — At 7:05 p.m., a tornado touched ground near the intersection of South Alma School Road and West Broadway in Mesa, moving in an east-southeasterly direction. It crossed Country Club Drive and turned northeast, dissipating near the intersection of South Mesa Drive and East Broadway. The tornado was attended by locally heavy rain and one-inch hail. Observers reported frequent cloud-to-cloud lightning near the storm and that some strokes were copper-

green in color. One injury occurred when a seventeen month-old girl was cut by flying glass. Property damage was estimated at $1,000,000 by Maricopa County Emergency Services.

October 18, 1982 — At 6:45 p.m., a tornado touched down about 1 mile east of Apache Junction. The storm was accompanied by marble-size hail and almost continuous lightning. Several mobile-homes were demolished by the wind. Most of the damage occurred near the intersection of Tomahawk Road and Scenic Road.

October 20, 1972 — At 12:00 noon, a funnel cloud aloft was observed about 8 miles north-northeast of Phoenix. The funnel did not touch ground. No damage was reported.

May 31, 1973 — At 4:45 p.m., the public reported a funnel cloud near 91st Avenue and McDowell Road, not touching ground. One-inch hail was reported in the same general area.

July 7, 1974 — At 2:00 p.m., a funnel cloud a few miles south of Chandler was reported by the public. It formed in the southeast sector of the storm and dissipated as the rain began.

August 24, 1974 — At 8:05 p.m., a small tornado, reported by the public, touched down near 193rd Avenue and West Earl Drive and destroyed a storage shed. It traveled from west to east.

May 4, 1976 — At 2:15 p.m., a tornado was observed to be about 1 to 2 miles north of Falcon Field, east-northeast of Mesa. It tore up the desert as it moved in a westerly direction and then dissipated as it entered a citrus grove. The light dust filled column was very pronounced against the dark cloud background, and it tilted toward the east with height. There was also a very narrow, rope-like, column a short distance to the east of the main tornado, and it curved to the east with height. The tornado lasted about 12 minutes, and no property damage occurred.

May 4, 1976 — At about 2:15 p.m. a tornado touched down about 5 miles southeast of Scottsdale Airport, as reported by the controllers in the Scottsdale Tower. The spinning dust filled column appeared to be about 40 feet in diameter, and there was much debris around the base of the column extending out for approximately 100 yards. The column was vertical up to about 800 feet and then curved to the northeast. It dissipated

about 20 minutes after forming. There was no property damage.

May 4, 1976 — At 3:03 p.m., a pilot reported a tornado over the Fountain Hills area. No damage was reported.

March 25, 1977 — At 12:55 p.m., a pilot on the ground reported a tornado about 2 miles west-southwest of Luke Air Force Base, moved north, and lifted into the cloud at 1;00 p.m.

July 26, 1978 — At 2:45 a.m., Maricopa Sheriff's Office reported a funnel cloud near Montezuma Peak. It was verified by radar with a hook echo at about 16 miles south-southwest of Sky Harbor International Airport.

December 30, 1978 — At 1:56 p.m. to 2:03 p.m., a very elongated funnel cloud was observed to the north-northeast of Sky Harbor International Airport by National Weather Service personnel. At 4:30 p.m., a funnel cloud was observed by the public to be northeast of Scottsdale. At 4:55 p.m., a family of three funnel clouds was observed by a pilot to be in the Four Peaks area.

January 25, 1979 — At 5:40 p.m., a funnel cloud was reported by the public and a pilot. It did not touch the ground, but associated strong winds destroyed one mobile home, damaged another, and tore down the rafters of a church under construction in Gilbert. At Sun Lakes, a large mobile home was overturned and heavily damaged. Numerous carports and roofs were also damaged.

February 1, 1979 — At 2:15 p.m., to 2:20 p.m., a funnel cloud was observed to the east of Sky Harbor International Airport and moving to the east. It was observed by National Weather Service personnel on duty.

March 28, 1979 — At about 6:30 p.m., a squall with severe thunderstorms passed through the Greater Phoenix Area. Localized severe damage was incurred along a line running from near Black Canyon Freeway and Thomas Road to beyond 32nd Street and Shea Boulevard. Many businesses and homes were either destroyed or heavily damaged. Only minor injuries were reported. Funnel clouds were observed. However, there was no confirmed sighting of a tornado. Scattered debris indicated no evidence of a tornado and damage was the result of a severe downburst. Total damage was estimated at about $5,000,000.

January 18, 1980 — At about 5:30 p.m., funnel clouds were observed by persons in Fountain Hills. A thunderstorm with

half-inch size hail, heavy rain, and vicious winds estimated at 100 m.p.h. damaged 50 residences in Fountain Hills and Scottsdale. In Fountain Hills, 4 were destroyed and 16 severely damaged. Study of the debris pattern showed a homogeneous direction, indicating a tornado was not involved. Only two persons received minor injuries. Total damage estimated at $1,000,000.

April 30, 1980 — At 9:52 a.m., a very slender funnel cloud was sighted by Deer Valley Control Tower operators to be about 3 miles to the southwest. It extended down about 500 feet from the cloud base and then retracted in four minutes. Movement was to the east.

September 5, 1981 — At about 7:20 p.m., a tornado touched down during a severe thunderstorm, for about one mile, in the far northern sections of Peoria and Glendale. It knocked down a section of a 69,000-volt power line, damaged several houses and mobile homes, and uprooted large trees. No injuries were reported.

August 8, 1983 — At 5:18 p.m., during a severe thunderstorm, a small tornado touched down near 83rd Avenue and Osborn and destroyed a barn.

August 16, 1983 — At about 5:10 p.m., a funnel cloud was sighted by the public over the western portion of Mesa.

August 16, 1983 — At around 5:30 p.m., during a violent thunderstorm a small tornado moved from south to north about 1/2 mile west of the western edge of Sky Harbor International Airport and covered a distance of about 0.3 of a mile. It stopped a moving car and exploded the windows. It also knocked down about a dozen power line poles, one of which severely damaged several parked cars on the south side of Buckeye Road.

April 28, 1984 — At 1:15 p.m., a pilot reported three funnel clouds three miles west of the Superstition Mountains.

August 9, 1984 — At 8:00 p.m., a small tornado touched down just northeast of I17 and Bell Road and moved to the southwest and then veered to the northwest for a total distance of about one-half mile. Several houses were damaged.

August 9, 1984 — At 8:00 p.m., Luke Air Force Base radar picked up an echo indicating either a tornado or a funnel cloud to the southeast. There was no visual contact and no evidence that it touched the ground.

August 15, 1984	At 2:45 p.m., a funnel cloud was reported by the public over the southeastern section of Mesa. It was visible for a few minutes.
September 18, 1985	At 3:40 p.m., a funnel cloud was reported by the public in the vicinity of El Mirage.
April 1, 1986	At about 7:50 a.m., over the extreme northern section of Phoenix, a series of small funnel clouds in rapid succession extended down a short distance and then drew back into the cloud base.
November 18, 1986	At about 5:00 p.m., a tornado hit near Apache Junction, ripped through two mobile-home parks, and damaged at least 60 homes. There were no injuries.

VII. SUNSHINE, CLOUDINESS, AND FOG

AVERAGE AND HIGHEST AND LOWEST PERCENTAGE OF POSSIBLE SUNSHINE BY MONTHS AND YEAR OF OCCURRENCE 1896-1985

	AVERAGE	HIGHEST	YEAR	LOWEST	YEAR
January	78	100	1924	54	1935
February	80	99	1924	47	1905
March	83	98	1959 1984	61	1905
April	88	98	1954 1961	68	1926
May	93	99	1924 1927 1942 1983	82	1953
June	94	100	1916 1917 1928 1939	78	1931
July	85	97	1961	67	1930
August	85	97	1956 1960	64	1935
September	89	99	1955 1956 1968 1973	76	1940
October	88	99	1973	65	1972
November	83	98	1948 1956	62	1965 1982
December	77	98	1958	47	1914
Annual	85	94	1960	75	1935

AVERAGE ANNUAL PERCENTAGE OF POSSIBLE SUNSHINE AT PHOENIX AS COMPARED TO OTHER MAJOR U.S. CITIES

Phoenix	85	Detroit	54	New York	59
Albuquerque	77	Great Falls	63	Oklahoma City	68
Atlanta	61	Houston	56	Philadelphia	57
Boston	60	Kansas City	63	Pittsburgh	49
Buffalo	52	Los Angeles	73	Saint Louis	58
Chicago	54	Memphis	65	Salt Lake City	69
Cleveland	51	Miami	73	San Francisco	67
Dallas	66	Minneapolis	58	Seattle	49
Denver	70	New Orleans	59	Washington	58

Sunshine, Cloudiness, and Fog

AVERAGE NUMBER OF CLEAR, PARTLY CLOUDY, CLOUDY AND HEAVY FOG DAYS BY MONTHS 1938-1985

	CLEAR	PARTLY CLOUDY	CLOUDY	HEAVY FOG
January	13.8	6.9	10.3	0.6
February	12.7	6.7	8.8	0.2
March	14.5	7.9	8.6	0.1
April	17.4	7.1	5.5	0.0
May	21.1	6.3	3.6	0.0
June	23.4	4.5	2.2	0.0
July	16.4	10.3	4.4	0.0
August	17.6	9.6	3.8	0.0
September	21.9	5.1	3.0	0.0
October	20.4	6.1	4.5	0.*
November	17.4	6.3	6.4	0.2
December	15.2	6.2	9.6	0.5
Annual	211.6	83.1	70.6	1.6

*Less than .05

GREATEST NUMBER OF CONSECUTIVE DAYS WITH 100 PERCENT SUNSHINE EACH DAY 1896-1985

28 days June 12-July 9 1928

GREATEST NUMBER OF CONSECUTIVE DAYS WITH 0 PERCENT SUNSHINE EACH DAY 1896-1985

3 days November 22-24 1965

Arizona Indian Proverb: "If the sun appears dead, not bright and clear, in the spring, expect poor crops and very little rain".

SUNRISE AND SUNSET AT PHOENIX, ARIZONA
MOUNTAIN STANDARD TIME

DAY	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.	
	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.
1	7 32	5 31	7 24	5 59	6 57	6 25	6 16	6 48	5 40	7 11	5 19	7 32	5 22	7 42	5 40	7 28	6 02	6 54	6 22	6 13	6 46	5 37	7 14	5 20
2	7 32	5 32	7 24	6 00	6 56	6 25	6 15	6 49	5 39	7 11	5 19	7 33	5 22	7 42	5 41	7 27	6 02	6 53	6 23	6 12	6 47	5 36	7 15	5 20
3	7 33	5 33	7 23	6 01	6 54	6 26	6 14	6 50	5 38	7 12	5 19	7 34	5 23	7 42	5 42	7 26	6 03	6 51	6 23	6 10	6 48	5 35	7 15	5 20
4	7 33	5 34	7 22	6 02	6 53	6 27	6 12	6 50	5 37	7 13	5 19	7 34	5 23	7 42	5 42	7 25	6 04	6 50	6 24	6 09	6 49	5 34	7 16	5 20
5	7 33	5 34	7 21	6 03	6 52	6 28	6 11	6 51	5 36	7 14	5 18	7 35	5 23	7 41	5 43	7 25	6 04	6 49	6 25	6 08	6 50	5 33	7 17	5 20
6	7 33	5 35	7 21	6 04	6 51	6 29	6 10	6 52	5 35	7 14	5 18	7 35	5 24	7 41	5 44	7 24	6 05	6 47	6 26	6 06	6 51	5 32	7 18	5 20
7	7 33	5 36	7 20	6 05	6 49	6 29	6 08	6 53	5 35	7 15	5 18	7 36	5 24	7 41	5 44	7 23	6 06	6 46	6 26	6 05	6 52	5 31	7 19	5 20
8	7 33	5 37	7 19	6 06	6 48	6 30	6 07	6 53	5 34	7 16	5 18	7 36	5 25	7 41	5 45	7 22	6 06	6 45	6 27	6 04	6 53	5 31	7 19	5 20
9	7 33	5 38	7 18	6 07	6 47	6 31	6 06	6 54	5 33	7 17	5 18	7 37	5 25	7 41	5 46	7 21	6 07	6 43	6 28	6 02	6 54	5 30	7 20	5 20
10	7 33	5 39	7 17	6 08	6 46	6 32	6 05	6 55	5 32	7 17	5 18	7 37	5 26	7 40	5 47	7 20	6 08	6 42	6 29	6 01	6 55	5 29	7 21	5 21
11	7 33	5 39	7 16	6 09	6 44	6 33	6 03	6 56	5 31	7 18	5 18	7 38	5 27	7 40	5 47	7 19	6 08	6 40	6 29	6 00	6 55	5 28	7 22	5 21
12	7 33	5 40	7 15	6 10	6 43	6 33	6 02	6 56	5 30	7 19	5 18	7 38	5 27	7 40	5 48	7 18	6 09	6 39	6 30	5 59	6 56	5 28	7 22	5 21
13	7 33	5 41	7 14	6 11	6 42	6 34	6 01	6 57	5 30	7 20	5 18	7 38	5 28	7 39	5 49	7 17	6 10	6 38	6 31	5 57	6 57	5 27	7 23	5 21
14	7 32	5 42	7 13	6 12	6 40	6 35	6 00	6 58	5 29	7 20	5 18	7 39	5 28	7 39	5 49	7 16	6 10	6 36	6 32	5 56	6 58	5 26	7 24	5 21
15	7 32	5 43	7 12	6 12	6 39	6 36	5 58	6 59	5 28	7 21	5 18	7 39	5 29	7 39	5 50	7 14	6 11	6 35	6 32	5 55	6 59	5 26	7 25	5 22
16	7 32	5 44	7 11	6 13	6 38	6 36	5 57	6 59	5 27	7 22	5 18	7 39	5 30	7 38	5 51	7 13	6 12	6 34	6 33	5 54	7 00	5 25	7 25	5 22
17	7 32	5 45	7 10	6 14	6 36	6 37	5 56	7 00	5 27	7 23	5 18	7 40	5 30	7 38	5 51	7 12	6 12	6 32	6 34	5 53	7 01	5 25	7 26	5 22
18	7 31	5 46	7 09	6 15	6 35	6 38	5 55	7 01	5 26	7 23	5 18	7 40	5 31	7 37	5 52	7 11	6 13	6 31	6 35	5 51	7 02	5 24	7 26	5 23
19	7 31	5 47	7 08	6 16	6 34	6 39	5 53	7 02	5 25	7 24	5 18	7 40	5 31	7 37	5 53	7 10	6 14	6 29	6 36	5 50	7 03	5 24	7 27	5 23
20	7 31	5 48	7 07	6 17	6 32	6 39	5 52	7 02	5 25	7 25	5 18	7 41	5 32	7 36	5 54	7 09	6 14	6 28	6 36	5 49	7 04	5 23	7 28	5 24
21	7 30	5 49	7 06	6 18	6 31	6 40	5 51	7 03	5 24	7 25	5 19	7 41	5 33	7 36	5 54	7 08	6 15	6 27	6 37	5 48	7 05	5 23	7 28	5 24
22	7 30	5 50	7 05	6 19	6 30	6 41	5 50	7 04	5 24	7 26	5 19	7 41	5 33	7 35	5 55	7 06	6 16	6 25	6 38	5 47	7 06	5 22	7 29	5 25
23	7 30	5 51	7 04	6 20	6 28	6 42	5 49	7 05	5 23	7 27	5 19	7 41	5 34	7 35	5 56	7 05	6 17	6 24	6 39	5 46	7 07	5 22	7 29	5 25
24	7 29	5 52	7 03	6 20	6 27	6 42	5 48	7 05	5 23	7 27	5 19	7 41	5 35	7 34	5 56	7 04	6 17	6 23	6 40	5 45	7 07	5 22	7 29	5 26
25	7 29	5 53	7 02	6 21	6 26	6 43	5 47	7 06	5 22	7 28	5 20	7 42	5 35	7 33	5 57	7 03	6 18	6 21	6 40	5 44	7 08	5 21	7 30	5 26
26	7 28	5 54	7 00	6 22	6 24	6 44	5 45	7 07	5 22	7 29	5 20	7 42	5 36	7 33	5 58	7 02	6 19	6 20	6 41	5 42	7 09	5 21	7 30	5 27
27	7 28	5 55	6 59	6 23	6 23	6 45	5 44	7 08	5 21	7 29	5 20	7 42	5 37	7 32	5 58	7 00	6 19	6 18	6 42	5 41	7 10	5 21	7 31	5 28
28	7 27	5 55	6 58	6 24	6 22	6 45	5 43	7 08	5 21	7 30	5 20	7 42	5 37	7 31	5 59	6 59	6 20	6 17	6 43	5 40	7 11	5 21	7 31	5 28
29	7 26	5 56	6 58	6 25	6 20	6 46	5 42	7 09	5 20	7 31	5 21	7 42	5 38	7 30	6 00	6 58	o 21	6 16	6 44	5 39	7 12	5 21	7 31	5 29
30	7 26	5 57			6 19	6 47	5 41	7 10	5 20	7 31	5 21	7 42	5 39	7 30	6 00	6 56	6 21	6 14	6 45	5 38	7 13	5 20	7 32	5 30
31	7 25	5 58			6 18	6 48			5 20	7 32			5 40	7 29	6 01	6 55			6 46	5 37			7 32	5 30

Add one hour for Daylight Saving Time if and when in use.

Prepared by
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WASHINGTON, D.C. 20390

VIII. WIND

AVERAGE SPEED, PREVAILING DIRECTION, AND PEAK GUST BY MONTHS AND DAY AND YEAR OF OCCURRENCE

	1946-1985		1938-1985			
	AVERAGE SPEED	PREVAILING DIRECTION	PEAK GUST	DIRECTION	DAY	YEAR
January	5.3	East	60	W	27	1983
February	5.9	East	54	W	19	1980
March	6.7	East	51	W	1	1977
April	7.0	East	49	SW	16	1976
			49	S	10	1977
			49	W	2	1981
May	7.1	East	59	SSE	20	1954
June	6.9	East	73	NE	5	1978
July	7.2	West	86	SE	7	1976
August	6.7	East	78	E	6	1978
September	6.4	East	75	SW	18	1950
October	5.9	East	61	W	1	1981
November	5.4	East	60	W	30	1982
December	5.2	East	68	W	4	1953
Annual	6.3	East	86	SE	July 7	1976

Arizona Indian Proverbs: "If the snow that falls during the winter is dry and is blown about by the wind, a dry summer will follow; very damp snow indicates rain in the spring".

"When smoke rises from the bottom lands and goes to the mountain, expect an early winter".

Wind

MEAN FREQUENCY OF OCCURRENCE OF PEAK WIND GUSTS BY MONTHS
1970-1985

MPH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
20-24	4	4	6	9	12	11	12	10	8	6	4	5
25-29	2	2	4	4	4	5	5	4	4	2	2	2
30-34	1	1	3	3	3	2	3	2	2	1	1	1
35-39	*	1	2	2	2	1	4	3	1	1	1	*
40-44	*	*	1	1	1	1	1	1	1	*	*	*
45-49	*	*	*	*	*	*	1	1	1	*	*	*
50-over	*	*	*	0	*	*	1	1	*	*	*	*

*Less than 0.5

Example: In July, on the average, there were 12 days with peak wind gusts 20-24 mph, 5 days with peak wind gusts 25-29 mph, 3 days with peak wind gusts 30-34 mph, etc.

ESTIMATED RETURN PERIODS OF PEAK WIND GUSTS BY MONTHS
Based on Period of Record 1957-1980

	RETURN PERIOD (YEARS)					
	10	25	50	100	200	500
January	44	52	59	67	76	90
February	48	58	66	75	86	102
March	47	53	57	63	68	76
April	47	51	55	58	62	68
May	49	55	61	67	74	84
June	53	61	68	75	84	96
July	63	73	81	90	99	114
August	63	71	79	86	95	108
September	50	55	60	65	70	78
October	50	61	70	80	92	110
November	48	59	68	78	90	109
December	39	44	48	52	57	64
Annual	71	80	88	97	106	120

Example: This means that in the month of July, a peak wind gust of 63 mph can be expected once every 10 years, a peak gust of 73 mph once every 25 years, a peak gust of 81 mph once every 50 years, etc.

IX. PRESSURE

AVERAGE AND HIGHEST AND LOWEST STATION PRESSURE BY MONTHS
AND DAY AND YEAR OF OCCURRENCE
Station Elevation 1107 Feet

1896-1985

	AVERAGE	HIGHEST	DAY	YEAR	LOWEST	DAY	YEAR
January	28.88	29.42	24	1938	28.20	4	1913
February	28.84	29.34	1	1916	28.24	23	1948
March	28.78	29.26	12	1920	28.24	3	1983
April	28.71	29.23	4	1945	28.27	28	1898
May	28.65	29.05	2	1970	28.19	18	1902
June	28.62	28.95	2	1919	28.31	20	1947
July	28.66	28.97	20	1974	28.33	14	1900
August	28.68	28.96	28	1896	28.37	22	1903
September	28.67	29.00	29	1970	28.24	24	1915
October	28.74	29.17	29 31	1980 1981	28.22	11	1928
November	28.84	29.32	18	1969	28.24	30	1982
December	28.88	29.44	24	1898	28.16	13	1984
Annual	28.75	29.44	24 December	1898	28.16	13 December	1984

Pressure

HIGHEST AND LOWEST SEA-LEVEL PRESSURE BY MONTHS
AND DAY AND YEAR OF OCCURRENCE

1896-1985

	HIGHEST	DAY	YEAR	LOWEST	DAY	YEAR
January	30.62	24	1938	29.35	4	1913
February	30.55	1	1916	29.36	23	1948
March	30.45	12	1920	29.37	26	1984
April	30.42	4	1945	29.37	28	1898
May	30.19	2	1970	29.32	18	1902
June	30.11	2	1919	29.40	20	1947
July	30.11	20	1974	29.43	14	1900
August	30.09	28	1896	29.47	22	1903
September	30.15	29	1970	29.34	24	1915
October	30.34	31	1981	29.34	11	1928
November	30.50	18	1969	29.37	30	1982
December	30.62	24	1898	29.30	13	1984
Annual	30.62	24 December	1898	29.30	13 December	1984
		24 January	1938			

Pressure

NORMAL 6-HOURLY PRESSURE CHANGES IN INCHES ENDING AT:

	0500M	1100M	1700M	2300M
January	-0.01	+0.06	-0.10	+0.04
February	0.00	+0.06	-0.10	+0.05
March	+0.01	+0.05	-0.11	+0.04
April	+0.02	+0.05	-0.12	+0.05
May	+0.03	+0.04	-0.12	+0.05
June	+0.03	+0.04	-0.12	+0.03
July	+0.03	+0.04	-0.14	+0.07
August	+0.03	+0.04	-0.13	+0.07
September	+0.02	+0.05	-0.12	+0.05
October	+0.02	+0.04	-0.11	+0.05
November	0.00	+0.05	-0.10	+0.05
December	0.00	+0.05	-0.10	+0.05

Source: NORMAL PRESSURE AND TENDENCIES FOR THE UNITED STATES, 1931-1940, Weather Bureau technical Paper No. 1, 1943.

X. FLYING WEATHER

PERCENTAGE FREQUENCIES OF CEILING-VISIBILITY

Ceiling (Feet)

Visibility (miles)	0	100-200	300-400	500-900	1000-1900	2000-2900	3000-4900	5000-9500	Over 9500	Total
0 to 1/8	+	+	+	0	0	0	0	+	+	+
3/16 to 3/8	+	0	0	+	0	0	0	+	+	+
1/2 to 3/4	0	+	0	+	+	+	0	+	+	+
1 to 2-1/2	+	0	+	+	+	+	+	+	.1	.1
3 to 6	0	0	+	+	.1	+	.1	.1	.3	.7
7 to 15	0	0	0	+	.1	.1	.7	2.5	44.4	47.9
20 to 30	0	0	0	+	+	.1	.4	1.1	22.1	23.7
35 or more	0	0	0	0	+	+	.2	.7	26.7	27.5
Total	+	+	+	.1	.2	.3	1.4	4.5	93.6	100

+Indicates more than 0 but less than .05 percent.

Source: SUMMARY OF HOURLY OBSERVATIONS -- PHOENIX, ARIZONA, 1951-1960, Climatology of the United States No. 82-2.

Flying Weather

FREQUENCIES OF VISIBILITY-RESTRICTING PHENOMENA
IN TOTAL NUMBER OF DAYS BY MONTHS OVER THE TWENTY-YEAR PERIOD
1965-1984

Visibility in Miles (Equal to or Less Than)

	1/4	1	3	6	1/4	1	3	6	1/4	1	3	6
	JANUARY				FEBRUARY				MARCH			
K,H	0	0	12	39	0	0	1	8	0	0	0	4
BD	0	0	1	3	0	2	4	10	0	4	7	19
F	11	14	18	25	1	1	1	4	3	4	4	6
R	0	5	16	35	0	0	11	32	0	2	18	41
	APRIL				MAY				JUNE			
K,H	0	0	0	0	0	0	0	0	0	0	0	0
BD	0	5	12	20	3	9	13	23	4	11	15	25
F	0	0	0	3	0	0	0	0	0	0	0	0
R	0	0	2	12	0	0	2	6	0	0	1	2
	JULY				AUGUST				SEPTEMBER			
K,H	0	0	0	1	0	0	0	0	0	0	0	1
BD	11	33	63	89	17	37	63	83	7	17	26	35
F	0	0	0	0	0	0	0	0	0	0	0	1
R	0	3	9	20	1	4	10	21	1	6	11	21
	OCTOBER				NOVEMBER				DECEMBER			
K,H	0	0	0	4	0	3	7	33	0	0	9	51
BD	2	3	8	16	0	1	6	6	1	1	2	3
F	1	2	2	3	6	6	8	9	8	8	14	16
R	0	1	7	16	0	2	14	29	0	3	18	48

SYMBOL KEY
K,H = Smoke and/or Haze
BD = blowing Dust
F = Fog (not accompanied by rain)
R = Rain (may be accompanied by fog)

Example: For the month of July over the twenty-year period, there was a total of 89 days when blowing dust reduced the visibility to 6 miles or less; on 63 of these days, it was reduced to 3 miles or less; on 33 of these days, it was reduced to 1 mile or less; on 11 of these days, it was reduce to 1/4 mile or less.

XI. HOLIDAY WEATHER INFORMATION

HOLIDAY	AVERAGE MAXIMUM TEMP 1951-1980	AVERAGE MINIMUM TEMP 1951-1980	HIGHEST MAXIMUM TEMP	YEAR 1896-1985	LOWEST MINIMUM	YEAR	FREQUENCY OF 0.01 INCH OR MORE OF PRECIPITATION IN PERCENT 1896-1985
New Years January 1	65	39	81	1981	24	1919	12
Presidents Day FEB 15-21	70-71	43	88	1977	26	1910 1964	18*
Easter Sunday MAR 22-April 25	76-86	48-55	103	1925	31	1897	9*
Memorial Day MAY 22-31	94-98	63-66	114	1910	48	1916 1917 1962 1965	2*
Independence Day JUL 4	105	77	114	1972	63	1912	7
Labor Day SEP 1-7	101-100	75-73	116	1950	60	1921	16*
Halloween OCT 31	81	53	91	1962 1965	36	1900	11
Arizona State Fair OCT 25-NOV 15	84-74	55-47	97	1934	28	1916	9*
Thanksgiving Day NOV 22-28	72-70	45-43	89	1950	27	1931	14*
Christmas Day DEC 25	65	39	78	1980	26	1926	16

*These percentages relate to the probability of precipitation on any one day of the given period.

XII. WEATHER EXTREMES

WEATHER EXTREMES FOR PHOENIX AS COMPARED TO THOSE FOR ARIZONA AND UNITED STATES

HIGHEST TEMPERATURE (Fahrenheit)		
Phoenix	118	July 16, 1925; June 24, 1929; July 11, 1958
Arizona	127	Fort Mohave June 15, 1896; Parker July 7, 1905
United States	134	Death Valley, California July 10, 1913
LOWEST TEMPERATURE (Fahrenheit)		
Phoenix	16	January 7, 1913
Arizona	-40	Hawley Lake January 7, 1971
United States	-80	Prospect Creek (25 SE Bettles), Alaska January 23,1971
	-70	Rogers Pass, Montana January 20, 1954
GREATEST PRECIPITATION IN ONE HOUR (Inches)		
Phoenix	1.72	August 18, 1966
Arizona	3.52	Tempe Citrus Experiment Station September 14, 1969
United States	12.00	Holt, Missouri June 22, 1947
	12.00	Kilauea Sugar Plantation Hawaii January 24-25, 1956
GREATEST PRECIPITATION IN TWENTY-FOUR HOURS (Inches)		
Phoenix	4.98	July 1-2, 1911
Arizona	11.40	Workman Creek (30 NNW Globe) September 4-5, 1970
United States	43.00	Alvin, Texas July 25-26, 1979
GREATEST PRECIPITATION IN ONE CALENDAR MONTH (Inches)		
Phoenix	6.47	July 1911
Arizona	16.95	Crown King August 1951
United States	107.00	Kukui, Hawaii March 1942
	71.54	Helen Mine, California January 1909
GREATEST PRECIPITATION IN ONE CALENDAR YEAR (Inches)		
Phoenix	19.73	1905
Arizona	58.92	Hawley Lake 1978
United States	704.83	Kukui, Hawaii 1982
	332.29	MacLeod Harbor, Alaska 1976
LEAST PRECIPITATION IN ONE CALENDAR YEAR (Inches)		
Phoenix	2.82	1956
Arizona	0.07	Davis Dam 1956
United States	0.00	Death Valley, California 1929
	0.00	Bagdad, California 1913

Weather Extremes

GREATEST SNOWFALL IN TWENTY-FOUR HOURS (Inches)		
Phoenix	1.0	January 20, 1933; January 20-21, 1937
Arizona	38.0	Heber Ranger Station December 14, 1967
United States	75.8	Silver Lake, Colorado April 14-15, 1921
GREATEST SNOWFALL IN ONE STORM (Inches)		
Phoenix	1.0	January 20, 1933; January 20-21, 1937
Arizona	67.0	Heber Ranger Station December 13-16, 1967
United States	189.0	Mt. Shasta Ski Bowl, California February 13-19, 1959
	175.4	Thompson Pass, Alaska December 26-31 1955
GREATEST SNOWFALL IN ONE CALENDAR MONTH (Inches)		
Phoenix	1.0	January 1933; January 1937
Arizona	123.0	Sunrise Mountain March 1973
United States	390.0	Tamarack, California January 1911
GREATEST SNOWFALL IN ONE SEASON (Inches)		
Phoenix	1.0	1932-1933; 1936-1937
Arizona	400.9	Sunrise Mountain 1972-1973
United States	1122.0	Rainier Paradise Ranger Station, Washington 1971-1972
	974.5	Thompson Pass, Alaska 1952-1953
GREATEST DEPTH OF SNOW ON THE GROUND (Inches)		
Phoenix	1	January 20, 1933; January 21, 1937
Arizona	91	Hawley Lake December 21, 1967
United States	451	Tamarack, California March 11, 1911
HIGHEST SEA-LEVEL PRESSURE (Inches)		
Phoenix	30.62	December 24, 1898; January 24, 1938
Arizona	31.21	Grand Canyon December 22, 1967
United States	31.43	Barrow, Alaska January 3, 1970
LOWEST SEA-LEVEL PRESSURE (Inches)		
Phoenix	29.30	December 13, 1984
Arizona	29.15	Flagstaff February 7, 1937
United States	26.35	Matecumbe Key, Florida September 2, 1935
HIGHEST WIND VELOCITY, PEAK GUST (Miles Per Hour)		
Phoenix	86	July 7, 1976
Arizona	92	Mesa, August 13, 1983
United States	231	Mt. Washington, New Hampshire April 12, 1934

NOAA Technical Memoranda NWS WR: (Continued)

121 Climatological Prediction of Cumulonimbus Clouds in the Vicinity of the Yucca Flat Weather Station. R. F. Quiring, June 1977. (PB-271-704/AS)
122 A Methoo for Transforming Temperature Distribution to Normality. Morris S. Webb, Jr., June 1977. (PB-271-742/AS)
124 Statistical Guidance for Prediction of Eastern North Pacific Tropical Cyclone Motion - Part I. Charles J. Neumann and Preston W. Leftwich, August 1977. (PB-272-661)
125 Statistical Guidance on the Prediction of Eastern North Pacific Tropical Cyclone Motion - Part Ii. Preston W. Leftwich and Charles J. Neumann, August 1977. (PB-273-155/AS)
127 Development of a Probability Equation for Winter-Type Precipitation Patterns in Great Falls, Montana. Kenneth B. Mielke, February 1978.(PB-281-387/AS)
128 Hand Calculator Program to Compute Parcel Thermal Dynamics. Dan Gudgel, April 1978. (PB-283-080/AS)
129 Fire Whirls. David W. Goens, May 1978. (PB-283-866/AS)
130 Flash-Flood Procedure. Ralph C. Hatch and Gerald Williams, May 1978. (PB-286-014/AS)
131 Automated Fire-Weather Forecasts. Mark A. Mollner and David E. Olsen, September 1978. (PB-289-916/AS)
132 Estimates of the Effects of Terrain Blocking on the Los Angeles WSR-74C Weather Radar. R. G. Pappas, R. Y. Lee, B. W. Finke, October 1978.(PB289767/AS)
133 Spectral Techniques in Ocean Wave Forecasting. John A. Jannuzzi, October 1978. (PB291317/AS)
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